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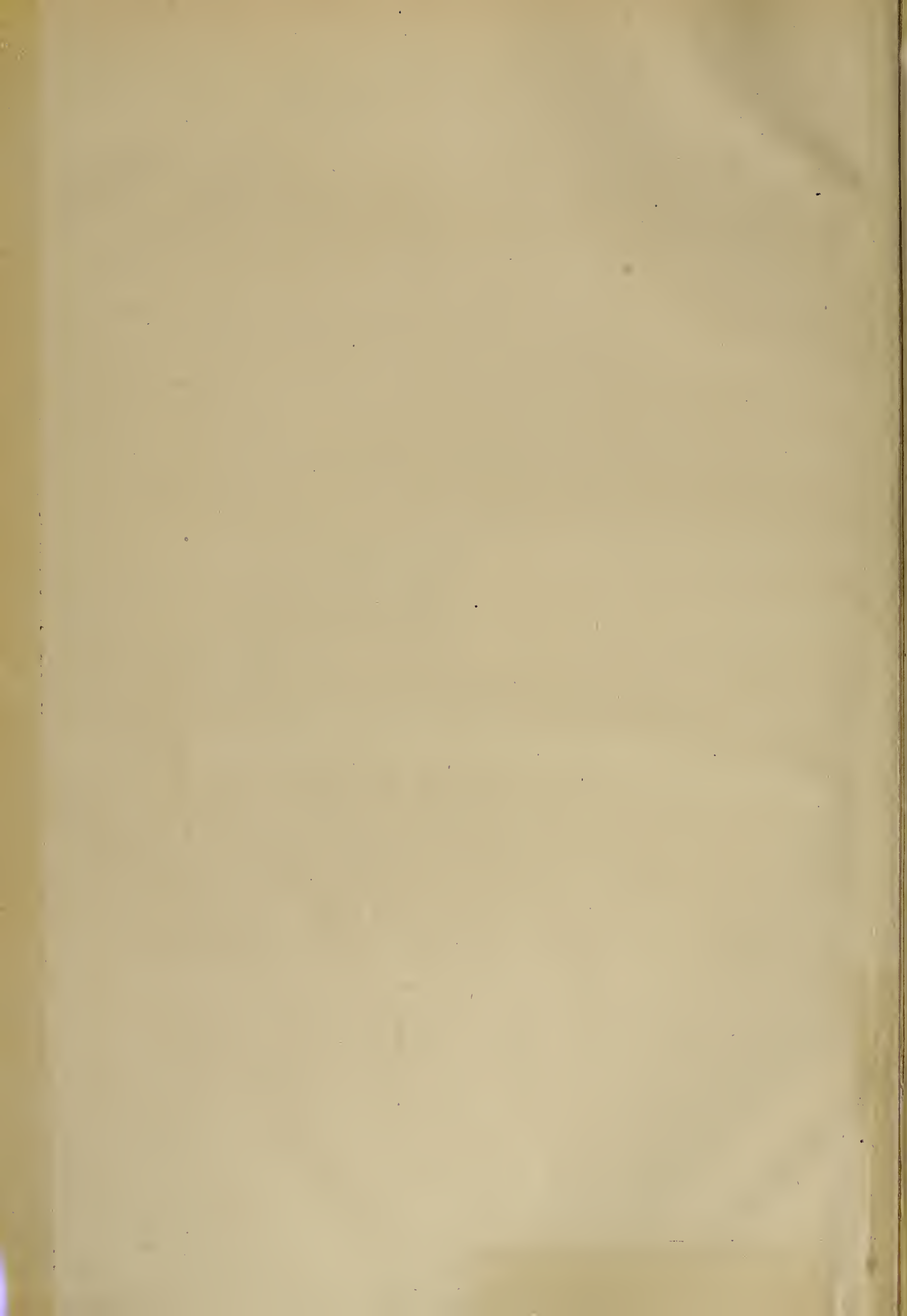
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 6, 1883.

VOLUME XLVI
Number 1

Dry Crushing and Roasting Mill.

We illustrate on this page the general plan of a dry crushing and roasting mill as arranged by the Pacific Iron Works of this city. The ore is brought to the upper story and dropped on to the grizzlies which are shown above. The fine ore passes on down, while the coarse ore is broken in the rock-breaker and then passes by chute down to the revolving drier.

What appears to be the furnace on the upper floor of the building is the Pacific revolving drier. This is to dry the ore before it goes into the batteries, and takes the place of the ordinary drying plates heretofore used. The ore is delivered from the crusher (shown in the engraving) directly into the drier, where it is showered through the flame as it is progressed through the cylinder, until discharged at the lower end. It is automatic in its operation, requires little fuel, and needs no attention. The ore is more thoroughly dried than is possible on plates. These driers are made 40"x30" diameter by 16 ft. long and 48"x30" 24 ft. long.

From this drier the ore goes to the batteries, and is then carried up into the furnace, where it is chloridized. The furnace used is the Howell-White, in which are combined the three essential requisites for the thorough and economical roasting and chlorination of ores: 1st. Continuous progression through and discharge of the ore from the furnace while it is being constantly stirred and showered through the heated air and gases, exposing it in the greatest possible degree to their reducing action. 2d. Increasing the heat on the ores as they are progressed through the furnace. 3d. Subjecting the ores to this showering process any length of time that may be necessary, with any given character of ore, for its thorough reduction.

For ores containing base metals this furnace affords a most economical process. The ore being exposed in the very greatest degree, and also for any desired time to the action of the receiving agents of heat, air or gases. The main fire enters the lower end of the cylinder and passes entirely through it. The ore is regularly and continuously fed from a hopper at the upper end, by a screw conveyor into the cylinder and constantly stirred and showered through the heated air and gases, by means of spiral ribs in the small section of the cylinder, and regularly progresses through it and discharges at the lower end into the ore chamber. The length of time is subject to regulation. The auxiliary fire at

the upper end of the cylinder is for the purpose of receiving the finer particles of ore which are carried back by the draft, which constitute, in many cases, 10 or 15 per cent. of the entire product, and which would otherwise be lost.

When the ore comes from the batteries conveyors move it along to the furnace, where the elevator deposits it in the hopper. After passing through the furnace the ore goes to the cooling floor shown below the furnaces. After being cooled it is taken to the pans, and thence passes to the settlers. The retorts are shown on the left. The drier, furnace, retorts and boilers each have independent stacks. A dry crushing 20-stamp mill such as the engraving

A New Amalgamator and Concentrator.

Wm. P. Davis, of 1232 Dupont street, in this city, has just received through the MINING AND SCIENTIFIC PRESS Patent Agency a patent for an improved ore concentrator and amalgamator of that class in which an endless belt travels upward against a stream of water and deposits its concentrations in a tank below.

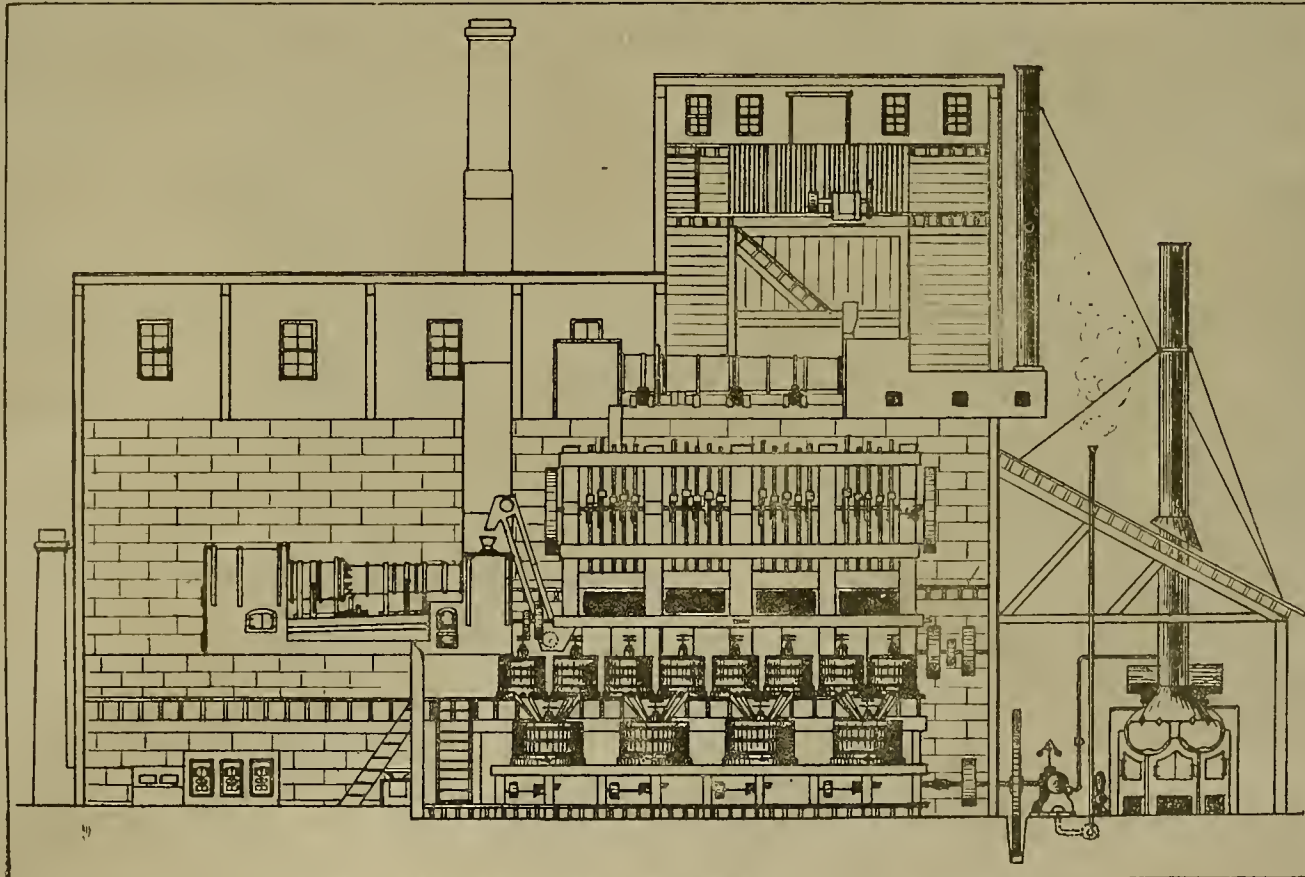
A tank having an inclined bottom has at its upper end a smaller tank for receiving the concentrations. The main tank is supplied with water from a pipe underneath, and has a discharge in its end near the bottom. In the re-

and against the belt as it travels upward. This pipe is loosely journaled in boxes, to have a certain lateral movement or vibration. The lateral vibration of the pipe causes a distribution of the jets over the belt. Above the belt, lower than the water pipe, is the ore distributor or feed, supplied from a small sluice. Water is also directed upon the belt at the edge of the water line by another water pipe.

In the lower end of the tank is a plate amalgamated on its lower surface and sustained on the surface of the water by means of suitable hangers. This plate extends between the water line upon the belt and the end of the tank.

The belt travels upward by means of power applied at the drum, its largest portion moving through the water. The ore is fed to the belt from the distributor, and moving up, meets the vibrating jets of water from the water pipe. By these jets a separation occurs at this point. The heavier particles or concentrations resist the downward flow of the water, and are carried down into the receiving tank, which contains clear water, and are washed off.

From this they are continually discharged through its bottom. The lighter or waste particles flow down over the belt with the waste water. They contain a portion of precious metal too light to resist the flow. The undulatory motion given by the cam roller, which is a main peculiarity of the machine, tends to settle them down upon the belt, and



GENERAL ARRANGEMENT OF A DRY CRUSHING AND ROASTING MILL.

represents will require an 18x46 Wheelock engine for power.

We learn from the *Pioche Record* that Eugene Blair, formerly of the police force in Virginia, Nev., with two or three prospectors, has gone off on a mining "still hunt" in Southern Arizona. The *Record* says: Although these individuals were very reticent as to what they were going after, we learn they go for the purpose of taking up the mica claims in that locality, of which there are large quantities. The blocks of mica that have from time to time been sent to Pioche from that vicinity are very fine specimens, and as the railroad will be running through that section within a year, these mica claims will probably become valuable, though worthless at present.

GARBER & THORNTON, of San Francisco, have commenced suit in the District Court at Eureka (Nev.) to recover from the Eureka Consolidated Mining Company \$60,000—a balance claimed by them for legal services rendered the company, principally in the great suit with the Richmond Mining Company, determined in the Supreme Court of the United States in March, 1881.

ceiving tank is journaled a driving drum to which power is applied. There are also suitable rollers arranged along the endless belt running over these and the driving drum.

To the belt is given what is known as an "up-hill travel," that is, it travels up the incline over the rollers and around the drum from which it derives its motion. All the rollers over which it passes, including the drum, are individually journaled in boxes provided with sorrows whereby each may be adjusted to vary the inclination or level of the belt at any desirable point, which is an advantage to the ore at different points upon the belt, as has been found by experience. One of the rollers over which the belt travels is cam-shaped, which gives the belt a gentle undulatory motion, which the inventor says is highly beneficial in settling the heavier particles. There is no side shake or end shake to the belt.

The water in both the main and small tanks is kept high enough to submerge the entire belt, with the exception of that portion of its top extending from the top of the main roller to about two-thirds of the way down.

Just over the belt at its highest point, which is above the roller, next to the upper one, is a water pipe arranged to throw jets of water upon

some are thus carried up and washed off in the upper tank. The rest continue down to the water's edge, where they are met by the downward jets of clear water from the supplemental pipe, and more evaporation occurs. What is left descends into the muddy water, and the floating gold is caught under the inverted amalgam plate. Others pass down through the amalgam grate and are caught, while the purely waste matter finds a discharge through the opening.

Thus during the entire operation the pulp is subjected to a concentrator and amalgamatory process. Any kind of belt is used, but the inventor says he has obtained good results upon some kinds of ore with a belt with a friction surface, made by mixing fine sand with the paint applied to a heavy canvas belt.

The legal holidays, other than Sundays, for 1883 will fall as follows: Twenty-second of February (Washington's Birthday), Thursday; 30th of May (Decoration Day), Wednesday; Fourth of July (Independence day), Wednesday; 25th of December (Christmas), Tuesday. Thanksgiving is selected by the President, and usually falls on a Thursday. If Admission day is observed it will be on a Monday, the 9th of September falling on a Sunday.

CORRESPONDENCE.

Notes From Eureka, Nevada.

(From our Correspondent.)

The new Richmond furnace will be started up, it is thought, about the 1st of January. I hear of nothing new at the mines. At the Eureka Con. there is nothing unusual to note. The new (Locan) shaft is at a standstill, and will be so until the sections of the accumulator arrive and are set in place. At the Albion the big smokestacks are finished, and are said by Supt. Robinson to be working with the flue-dust chambers satisfactorily, doing the work required as smoothly as can be desired. Down in the mine developments are progressing steadily day by day, giving testimony to the increasing worth of the property.

New strikes are reported occasionally, but from their position it appears that they are all on the same fissure as the huge Richmond ore bodies, and which extends across the A. C. line in a northwesterly direction through the Albion ground.

The Latest Strike

Made in a triangular cave, dimensions about 33 ft. from north to south, and 32 ft. from east to west. The bottom is filled with debris. On the west wall of it is a body of ore, on which a raise of 20 ft. has been made. Samples taken from different places show the value to be at the rate of \$135 silver and \$6 gold per ton; it also carries 22 1/2% of lead. It is situated on the same level as the October cave, about 120 ft. westward from it.

In the west drift from the east upraise the entire face is all in ore. Twenty ft. below the same is a west drift, just now broken into ore, the distance of the same being 180 ft. from the A. C. line and chamber B, from which large quantities of ore are still being taken.

I understand that the Albion Company have shipped 1,779 bars of base bullion up to Dec. 1st, and from then up to the present time they have shipped 2,899 bars; added to which, the melted bullion in the furnace pit may run the number up to 3,000 bars. Supt. Robinson confidently asserts that when both furnaces are running under full blast he will ship about 10,000 bars per month. If my information from the smelters that No. 2 furnace is not running up to more than two-thirds of its capacity, is correct, Mr. Robinson's statement is made from inference from present results.

Among some of the

Earliest Locations Made in Eureka District Are the mines of the Alexandria Company, but they have been worked by the most primitive methods, and up to the present date with exceeding irregularity. The ores from them were among the first smelted in the district, having been sold at the old Roslin furnace, the only one then in operation here. The Alexandria mine is situated a few hundred ft. above the El Dorado No. 2 main shaft, and is on the same mineral belt of limestone as the Eureka Tunnel ore bodies. From time to time large quantities of ore have been produced that will probably aggregate \$60,000. The expenses of development, reduction works, etc., will reach \$40,000. Several good strikes have been made by parties leasing the property. The company have lately purchased the Sterling series of locations adjoining it, owned by the Sterling Mining Co., a corporation possessed of no other capital than was taken out of the mine. It, however, is undoubtedly a valuable property, that, by the application of adequate means to develop it, will become dividend-paying. A force of men have been set to work grading a road for the purpose of removing the hoisting machinery from the Alexandria incline shaft to a vertical shaft on the Dilligent location, 200 ft. south of it.

This Shaft is Now Down

One hundred feet, and will be carried to a depth of 500 ft., more or less, to the level of the Eureka tunnel, with which it is intended to make connection for the purpose of easy extraction of ore and cheap disposal of waste rock. A wagon road will also be extended from the mine to one now built to New York canyon, which will give thorough and easy access. It is estimated that there are trees on the ground sufficient to provide fuel for running the engine for two years. The ore obtained is generally of good quality, running as high as \$400 per ton. There is also a quantity that is of a grade hitherto unprofitable to work.

At the Lizzie L., in running a drift to connect with a cave discovered a few weeks ago, some ore was struck in a fissure. It is four feet thick, and has been stripped for six feet along the vein; but the extent of the body is not yet known. Assays show a value of \$143 per ton in gold and silver. At the Grant mine nothing but dead work is being done at present. The Geraldine tunnel, now in 130 ft., has to be driven 40 ft. farther to connect with the old workings, out of which very large quantities of rich ore have been taken.

On Adams Hill

The Bowman Company have just shipped 25 tons of ore to the Eureka Con. furnaces that worked over \$100 per ton. This mine is producing favorably.

Grif. J. Griffith, the superintendent of the Walee Con. is in Eureka. He says he will resume work on the mine. Should anything be

done actively the public will be duly informed of it. Last month the Bertrand Company averaged a run of 55 tons of ore per day. It cost \$2.25 to mine, and about \$9 per ton to mill. I learn that the ore yields from 20 to 25 ozs. of silver per ton.

Work has been resumed in the south shaft of the Medora Con. mine, adjoining the old Page and Corwin, and a vein of ore 8 inches thick, very rich, has been struck. Thirty tons of ore are being shipped from the Fairplay mine on the Alhambra hill to the Eureka Con. furnaces.

I hear that the richest ore even taken out of the Bay State mine at Newark, White Pine county, has been struck within the past week. This property is capable of producing large quantities of high grade ore, and still greater of middle class. It is a regular shipper to the Richmond furnaces in Eureka, as are other mines in that locality. Yours truly,

M. H. JOSEPH.

The Transit Observations and Longitudes.

Dr. A. F. Goddard writes to the Sacramento Record-Union as follows: "With regard to the vexed question of longitudes, and the correct time of the several contacts during the transit of Vonne, December 6th, I believe the whole matter can be reconciled something as follows: It appears that we cannot exactly adopt the Signal Service longitudes in another paper. For instance, Professor Davidson's observatory on Clay-street hill and Octavia street, where Captain Gilbert (in charge) took the observation, is in longitude 122° 25' 41s., as determined by Professor Davidson a few years since, whereas the Signal Service still call San Francisco 122° 26' 15s., which was what Lieutenant Trowbridge made Lime Point, in San Francisco bay, in the Coast Survey of 1853-54. It gave the relative time from Greenwich 8h. 9m. 45s., while Prof. Davidson's observatory gives it 8h. 9m. 42.733s., or about 2 1/2s. difference in time. But the Signal Service Washington longitude of 77° 1m. is much more out of the way from the Dome observatory. It is true that it has been variously computed at different times from 77° 0m. 15s. to 77° 3m., which may be found in Black's atlas, published in 1871; but Johnson's cyclopedia, 1877, and Loomis' astronomy, give it 77° 2m. 45s. If we take the relative difference, however, of the late eminent and lamented Dr. Draper's computation of his observatory at Hastings, near New York, which in his transit of Mercury observations, May 6, 1878, he gave as 73° 52m. 25s., or 23h. 47m. 18s. in time, calling Washington 24h. The difference, 12m. 42s., is equal to 31.10m. 30s., which, added to 73° 52m. 25s., makes 77° 2m. 55s. This is doubtless very nearly correct. But special observations for longitude or time from Greenwich, after the electric Atlantic cable was laid, were taken by Dr. Gould, Professor Hilgard and another, which gave a mean of 5h. 8m. 12.12s., convertible to 77° 3m. 1.8s. Washington; so probably that is most correct of all, and is our starting point. Then we deduct 5h. 8m. 12.12s. from Professor Davidson's observatory—8h. 9m. 42.733s.—we have 3h. 1m. 30.613s. as the difference between Washington time and the Clay street observatory; or, if we please, deduct 77° 3m. 1.8s. Washington, from 122° 25m. 41s., Clay street, giving 45° 22m. 39.2s. these should give the same results in time, or show that the Atlantic cable observations were not connected with the same part of Washington. It does give us the same result or 3h. 1m., 3.6 sec., for difference between Washington and the Davidson observatory. Therefore, if we take the given predicted Washington time for the transit and deduct the difference, we shall have the predicted time for Professor Davidson's observatory in San Francisco, Captain Gilbert's place of observation—not of course the Cerro Rohlero N. M., station, where Professor Davidson had such admirable success—except, however, the first contact, which his station seems to have missed, as the sun was less than a diameter above the Organ mountains at the first internal contact. Well, then, the prediction for Captain Gilbert stood:

	Washington.	San Francisco.
First contact.....	3:55 A. M.	5:53 56.4 A. M.
First internal contact.....	9:16 A. M.	9:14 56.4 A. M.
Second internal contact.....	2:33 P. M.	11:36 56.4 A. M.
Last contact.....	3:00 P. M.	11:58 56.4 A. M.

But there is an admirable chart in Proctor's "The Universe and the Coming Transits," showing that ingress is retarded eight minutes at about 105° longitude, and egress accelerated three to four minutes on our coast, and five minutes at about 104° longitude. The second internal or third contact was not due at 11h. 36m., 56.4 sec., but at some figure we must ascertain. It is not quite clear, however, that the eight minutes, or even seven and a half minutes' retardation extends further than the diagonal path shown running from about Wyoming to the Gulf of California, but it undoubtedly indicates important differences which may clear up the observed differences at San Francisco and Sacramento.

Captain Gilbert recorded his observation of the second internal contact at 11h. 42m. A. M. and the last contact at 12h. 2m. 10s., showing 5m. 3.6s. retardation at the third contact, and 3m. 13.6s. at the last contact from the Washington predicted time. But it appears that the well-known medical almanac of Dr. Jayne, Philadelphia, gives the time for thirty-one cities in the United States, including Sacramento and San Francisco, and 11h. 42m. A. M. is given for San Francisco, and we may note that if we deduct three minutes' acceleration from eight minutes' retardation, it leaves the retard-

ation five minutes, or within 3.6s. of the observation, or taking the last contact and deducting 3 1/2m. acceleration from 7m. retardation, it would give us 3 1/2m. retardation, which would be within 3.6s. of the last contact observation at San Francisco. A very little alteration in the proportions of the acceleration and retardation would give the exact results, therefore I have dwelt upon the San Francisco observations because they afford the key to the correctness of Major Bender's at the State Capitol; but now, then, we must ascertain what the longitude of our State Capitol is. Professor Hall kindly informs me that it is 27.85 miles less or east of 122° 1. true longitude. At 351.35m. Sacramento latitude that would give us 121° 29m. 7.4s., while the Coast Survey in 1878 ordered 1m. added to every degree of old longitude, showing that formerly it would have read, after adding the 1m. 121° 30m. 7.4 sec. The Signal Service figure—121° 31m.—appears to be too much. Adopting 121° 29m. 7.4s., then, as the longitude of the State Capitol west of Greenwich, the difference from San Francisco is 56m. 33.6 sec.; for adding that to my computation of the dome of the State Capitol—121° 29m. 7.4 sec.—which has never been given by any civil engineer before, we have 122° 25m. 41 sec. for Prof. Davidson's observatory on Clay street hill. It must be recollected that the Coast Survey Office, Washington square, San Francisco, was called in longitude 122° 24m. 35.49 sec., but no doubt should have been 122° 25m. 35.49 sec. The 56m. 33.6 sec. gives us 3m. 46.24 sec. difference of time, or later than San Francisco, so that, as we found before, that the San Francisco, or Captain Gilbert's observation of 11h. 42m. came out right with the proper retardation added, and conformed to Dr. Jayne's almanac; so if we add 3m. 46.24s., as a result, 11h. 45m. 46.24s., which includes the same retardation as we allowed for San Francisco, and this comes out 13.76s. only less than 11h. 46m. given in Dr. Jayne's almanac. The observation was, in fact, called, as explained last week, at 11h. 42m. 55s., San Francisco time, adding 3h. 46m. 24s.; therefore, we have 11h. 46m. 31.24s., showing that Major Bender was probably 31.24s. late, as he was confident he was, and even admitted 13.76s. more, which would make the actual occurrence precisely what I estimate it should have been, 11h. 45m. 46.24s. My mode of getting the true retardation was only approximate, however. The last contact would work out as follows: Captain Gilbert's was 12h. 2m. 10s., with probable retardation of 3m. 13.6s. included. We have then merely to add the difference of our time, 3m. 46.24s., to 12h. 2m. 10s., making 12h. 5m. 56.24s. The actual time Mr. Shearer called to Major Bender was 12h. 2m. 25s., by San Francisco time; adding, therefore, 3m. 42.24s. The Sacramento time called was 12h. 6m. 11.24s., showing a possibility that it was called 15 seconds too late to be in harmony with Captain Gilbert's. Thus, then, we have arrived at conclusions that harmonize with science and the facts, and prove the correctness of Captain Gilbert's observations. Prof. Proctor's elaborate descriptions and chart for the transit of December 6, 1882, and the really admirable precise figures given by Dr. Jayne's almanac, for which his astronomer is deserving of the public thanks, whereas the *Scientific American*, if it quoted from the Nautical almanac, which I have not yet had an opportunity of seeing, still only gave us the Washington time without the retardation added, and was consequently misleading. It was only a few days since that Dr. Jayne's almanac was brought to my notice, which, together with Proctor's chart, I believe clears up the whole mystery, now that I have ascertained the various longitudes of Washington, San Francisco, and our own State Capitol, which have never been given to the public before. I have labored with zeal and a determination to master the question, and have the satisfaction at least that "truth brings its own reward," and some, at least, of the public, I am sure, will appreciate my endeavor.

New State Officers and Legislature.

The following is a list of the State officers elect, with postoffice addresses of same:

Governor—George Stoneman, San Gabriel, Los Angeles county.
Lieutenant-Governor—John Daggett, Oakland—formerly Klamath Mills, Siskiyou county.
Secretary of State—T. L. Thompson, Santa Rosa, Sonoma county.
Controller—J. P. Dunn, San Francisco.
Treasurer—W. A. January, San Jose.
Attorney-General—E. C. Marshall, San Francisco.
Surveyor-General—W. L. Willey, San Diego.
Superintendent of Public Instruction—W. T. Welcker, San Francisco.
Clerk of Supreme Court—J. W. McCarthy, Modesto, Stanislaus county.
Railroad Commissioners—G. J. Carpenter, Placerville, El Dorado county; W. P. Humphries, San Francisco; W. W. Foote, Oakland.
Board of Equalization—Charles Gilden, San Francisco; L. C. Morehouse, San Leandro, Alameda county; C. S. Wilcox, Yuba City, Sutter county; John Markley, Sinaloa.
Congressmen—Charles A. Sumner, San Francisco; J. R. Glascock, Oakland; W. S. Rosecrans, San Francisco; James H. Budd, Stockton; Barclay Henley, Santa Rosa, Sonoma county; P. B. Tully, Gilroy, Santa Clara county.
Senate.
First District—San Diego and San Bernardino, John Wolfkill, D., Bernardo, San Diego county.
Second District—Los Angeles, R. F. Del Valle, D., Los Angeles.

Third District—Ventura, Santa Barbara and San Luis Obispo, George Steele, R., San Luis Obispo.
Fourth District—Fresno, Tulare, Kern, Mono and Inyo, Patrick Reddy, D., Bodie.
Fifth District—Mariposa, Merced and Stanislaus, J. D. Spencer, D., Modesto.
Sixth District—Monterey, San Benito and Santa Cruz, Benjamin Knight, D., Santa Cruz.
Seventh District—Santa Clara, C. H. Maddox, D., San Jose; B. D. Murphy, D., San Jose.
Eighth District—San Francisco and San Mateo, Jeremiah Lynch, D., San Francisco.
Ninth District—San Francisco, T. McCarthy, D.; John Harrigan, D.
Tenth District—San Francisco, David McClure, R.; George H. Perry, R.
Eleventh District—San Francisco, Edward Keating, D.; T. R. Nelson, D.
Twelfth District—San Francisco, J. T. Dougherty, D.; Martin Kelly, D.
Thirteenth District—San Francisco, J. F. Sullivan, D.; W. Cronan, D.
Fourteenth District—Alameda, Henry Vrooman, R., Oakland; George E. Whitney, R., Oakland.
Fifteenth District—Contra Costa and Marin, W. B. English, D., Concord, Contra Costa county.
Sixteenth District—San Joaquin and Amador, B. F. Langford (joint), D., Acampo; F. T. Baldwin, D., Stockton.
Seventeenth District—Calaveras and Tuolumne, C. D. Reynolds, D., Milton, Calaveras county.
Eighteenth District—Sacramento, Joseph Routier, R., Routier's P. O.; Frederick Cox, D., Sacramento.
Nineteenth District—Solano and Yolo, J. M. Dudley, R., Dixon; K. E. Kelley (joint), D., Fairfield.
Twentieth District—Napa, Lake and Sonoma, Dennis Spencer, D., Napa.
Twenty-first District—Sonoma, George A. Johnson, D., Santa Rosa.
Twenty-second District—Placer, J. A. Filcher, D., Auburn.
Twenty-third District—El Dorado and Alpine, Thomas Fraser, R., Placerville.
Twenty-fourth District—Nevada and Sierra, C. W. Cross, D., Nevada City; H. W. Wallis (joint), R., Forest City, Sierra county.
Twenty-fifth District—Yuba and Sutter, A. L. Chandler, R., Nicolaus.
Twenty-sixth District—Butte, Plumas and Lassen, W. W. Kellogg, D., Quincy, Plumas county.
Twenty-seventh District—Mendocino, Humboldt and Del Norte, P. H. Ryan, D., Eureka.
Twenty-eighth District—Siskiyou, Modoc, Trinity and Shasta, Clay W. Taylor, D., Shasta.
Twenty-ninth District—Colusa and Tehama, C. F. Foster, D., Red Bluff.

Assembly.

Alameda—L. H. Cary, R., Oakland; W. B. Clement, R., Alameda; R. L. H. Brown, R., Haywards.
Amador—A. Caminetti, D., Jackson; Robert Stewart, D., Volcano.
Butte—L. C. Granger, D., Oroville; T. R. Fleming, D., Gridley.
Contra Costa—G. W. T. Carter, R., Byron.
Calaveras—A. K. Wheat, D., Valley Springs.
Colusa and Tehama—Renben Clark, D., Williams, Colusa county.
Del Norte—W. A. Hamilton, D.
El Dorado—C. F. Irwin, D., Placerville.
El Dorado and Alpine—Thomas B. Rowland, D., Rowland's Lake Tahoe.
Fresno—W. D. Grady, D.
Humboldt—H. G. Weaver, R., Eureka.
Inyo and Mono—J. M. Keller, R., Lone Pine, Inyo county.
Los Angeles—A. B. Moffitt, D., San Fernando; H. W. Head, D., Garden Grove.
Lake—H. J. Crumpton, D.
Mariposa and Merced—W. L. Smith, D., Mariposa.
Marin—S. C. Bowers, D., San Rafael.
Mendocino—Archibald Vell, D.
Monterey—Thomas F. Paw, D., Chualar, Monterey county.
Napa—F. E. Johnston, D.
Nevada—J. L. Levison, R., Truckee; A. Walrath, R., Nevada City; J. O. Sweetland, D., Sweetland.
Placer—P. McHale, D., Michigan Bluff.
Plumas and Lassen—Calvin McCluskey, D., Sausalville.
San Francisco—Ninth District—E. Gausrail, D.; W. J. Simon, D.; Thomas F. Barry, D.; James Callaghan, D. Tenth District—Charles A. Muddock, R.; J. H. Culver, R.; B. F. McKinley, R.; A. G. Booth, R. Eleventh District—Peter Wheelan, D.; Thomas Healy, D.; Bernard Rawle, D.; Sydney Hall, D. Twelfth District—T. H. McDonald, D.; M. R. Levison, D.; James J. Flynn, D.; P. Plover, D. Thirteenth District—Charles A. Hughes, D.; D. H. Hibb, D.; Thomas H. Murphy, D.; E. J. O'Connor, D.
Sacramento—H. M. Larue, D., Sacramento; F. D. Ryan, R., Sacramento; Gillis Doty, D., Elk Grove.
San Diego—Edwin Parker, D., San Diego.
San Bernardino—Trueman Reeves, R.
San Luis Obispo—S. H. Hollister, R.
Santa Barbara and Ventura—C. A. Storke, D., Santa Barbara.
Santa Clara—A. B. Hunter, D., Santa Clara; J. H. M. Townsend, D., San Jose; Adam Rhiel, D., Gilroy.
Santa Cruz—Lucien Heath, R., Santa Cruz.
San Benito—J. H. Matthews, D.
San Joaquin—S. L. Terry, D., Stockton; C. S. Stephens, D., Stockton; J. W. Kerrick, D., Collegedale.
San Mateo—J. V. Coleman, D., Menlo Park.
Sierra—M. Farley, D., Downville.
Siskiyou and Modoc—Peter Peterson, D.
Stanislaus—E. B. Beard, D.
Solano—Joel A. Harvey, R., Fairfield; D. G. Barne, R., Vallejo.
Sonoma—John T. Campbell, D., Santa Rosa; S. M. Martin, D., Petaluma; John Field, D., Cloverdale.
Sutter—S. R. Fortna, D., Yuba City.
Trinity and Shasta—J. M. Briceland, D.
Tulare and Kern—W. L. Morton, D., Grangeville, Tulare county.
Tuolumne—F. D. Nicol, D., Sonora.
Yolo—D. N. Hershey, D., Black's Station.
Yuba—W. M. Cutter, D., Marysville; N. Coombs, D.

Recapitulation.

Senate—Democrats, 30; Republicans, 10; Democratic majority, 20. Assembly—Democrats, 62; Republicans, 18; Democratic majority, 44.

MECHANICAL PROGRESS.

Asphalt Foundations for Machinery.

Parties who find their business interfered with by vibrations produced by a neighbor's machinery are very apt to seek redress at the hands of the law. Such litigation is attended with loss of time and temper, if not of money; it makes enemies of neighbors, and should, if possible, be avoided. The offending party will find it to his advantage to incur considerable expense in abating the nuisance, rather than subject himself to be mulcted in damages to an amount which a jury is to fix. Timber and masonry, the materials usually employed for foundations, have been found to transmit injuriously the vibrations of machinery placed upon them and firmly secured. Similar machinery, similarly secured upon a foundation of asphalt concrete has, when driven at an equal rate, produced no perceptible vibration. The asphalt referred to is a natural product of bituminous limestone, consisting of carbonate of lime and mineral bitumen intimately commingled by natural agency. If to this rock, ground to powder, an additional portion of similar bitumen be added, and the whole thoroughly mixed when hot with clean dry sharp sand, free from all earthy matters, we have the gritted asphalt-mastic so successfully used just prior to the Paris exhibition, 1878, and during that event, for the construction of non-vibrating foundations, by Mr. Wm. H. Delano, engineer of the company organized for this manufacture of that article.

A striking instance of the value of this preparation as a foundation for machinery is given in their own experience. One of the heavy mills used by the company for grinding rock, when running at its usual rate of 500 revolutions per minute, caused a neighboring factory for painting on glass and china to vibrate to such a degree both in the works and in the counting-room that the proprietor threatened to bring suit. The area thrown into vibration by the mill had a radius of over a hundred feet, and the company wisely resolved to remove the foundation of wood and masonry and substitute their own material for it. This was done under both machinery and walls. It is now impossible to know by the vibration when the mill is running. There have never been any yielding, settling or repairs since it was laid.

Subsequently the foundation for a dis press for stamping out iron frames, and striking 12 blows a minute, was laid in asphalt with equal success. Foundations of asphalt for steam hammers at the artillery factory at Vincennes, at the shops of the Paris, Lyons, and Mediterranean railroad, and elsewhere, have also given every satisfaction.

The method employed for the large grist mill making 1,400 revolutions a minute, at the Paris Exhibition of 1878, will serve to illustrate the general course to be pursued in laying such a foundation. An oak frame-work was first built in the excavation, and the places marked for the bearings, recesses, etc., surrounded by a rough caisson of planking, firmly supported by stays from the outside to prevent bulging. A layer of hot gritted asphalt-mastic was then poured on the floor and covered with a layer of flint-stone and rubble, perfectly dry; next a layer of mastic followed by a layer of flint and rubble, and so on, until the top was reached. The whole was then left 10 days to cool and settle. At the end of that time the surface was dressed with mastic and the planking removed. Earth was then filled in all around to the required height, and the machinery fixed and started. At the close of the exhibition it was found impossible to break up this material, and as blasting could not be allowed in the city, this block, weighing 45 tons, remains in the ground of the Champs de Mars, opposite the Military school. The proportions used were 60 per cent. flint and rubble and 40 per cent. gritted mastic. Of the latter about 7 per cent. was bitumen, from which all matters volatilizable at 428° Fah. had been driven off.

We condense the above from the *Textile Record*. In connection with the same we would give the following, which it is said will form a very good floor for a machine shop and even quite a good foundation for the building and machinery to rest upon: First make a proper excavation, then whet in gravel and dirt, ram them down, run water upon them, and allowing it to settle; then adding 6 inches of fine, sharp, olean sand, roll this well with a heavy roller. Upon this lay inch boards, both sides coated with boiling tar. Upon this lay on end blocks of square wood, 5 inches long, one end dipped into tar for two-thirds its length, and set tarred end down.

STEEL VS. IRON RAILS.—The gradual disuse of iron rails is shown by the fact that in the last few months this country has entirely ceased to import them from Great Britain, and that in the eight months ending with August there was a decrease in their exportation from England of 16½%. The steel rail exports, however, in the same length of time, increased from 339,686 to 505,017 tons. Our own rolling-mills are also turning out a much larger proportion of steel rails. The mill at Pueblo, Colorado, are fitted up for making steel rails only, of which they turn out about 1,000 per day.

American vs. English Nailmakers.

Discussing the prospects of the nail trade, a Birmingham (Eng.) correspondent of the *London Ironmonger* says: Foreign competition in this branch is relaxed by the action of American nailmakers, who have advanced prices from 15 cents to 20 cents per keg. These advanced rates, which are much above those demanded by English makers, have of course greatly improved the chances of English nails in Canada, Australia and other neutral markets, though many even in our own colonies appear to be strongly biased still in favor of the American article, owing to the greater uniformity of quality. It is not denied that English manufacturers can produce as good or even a better nail than the Americans, but they do not always do so; and the merchants who conduct the trade are apt in buying to sacrifice higher considerations to cheapness. The Americans are wiser in their generation, and frankly recognize the impossibility of competing with English makers in cheapness; they strive to excel in quality, uniformity and excellence of patterns. On the whole, these tactics have been of great service to them, and have given them a footing in many markets from which it will be no easy matter to dislodge them.

Statistics show that over 85,000 kegs of American nails and spikes were exported last year. They went to over 40 different countries, including England, Ireland and Scotland. Chili took the most, 1,806,500 lbs.; Mexico next, 1,321,512 lbs., and Cuba third, 1,269,120 lbs. The British possessions in Africa took 581,987 lbs. This new departure in this manufacture, of making nails from mild steel instead of iron, will no doubt greatly influence the quality of American nails, and possibly increase the foreign demand for them.

TEMPERING STEEL.—More tools are ruined by overheating, cold-hammering and overtempering than can be redeemed by all the new recipes that have been invented. The only way that is really good is first to find a brand of steel that is good and suitable for the tools to be made, and stick to it. Next find by a few trials the lowest heat that will harden it in pure water at 70° or ordinary shop temperatures. If steel is hardened at the lowest heat, the temper will require drawing very little—i. e., to a pale straw, full straw, or brownish yellow, but not deeper unless for wood-working tools with thin cutting edges, when a full brown may be desirable. File makers use salt water for a hardening bath, because it makes the water more dense, and the teeth harder, and, of course, more brittle. Sulphuric acid or mercury is sometimes used for hardening very small tools for cutting glass and etching stone. For springs the same care should be taken in regard to low, even heating that is necessary with tools. Pure lard oil is as good, and probably better, than any of the many mixtures that have been tried for the hardening fluid. Burning off may do for drawing the temper of small or thick springs, but is totally unfit for long or slender ones. Dip the hardened spring into a bath of oil heated nearly to its boiling temperature. This is the only way to get an even temper.—*Scientific American*.

IMPROVEMENTS IN TEMPERING GLASS.—The high expectations in regard to the Bastic method of toughening glass do not appear to have been fully realized, and any improvement thereupon will be welcomed. That method consisted in immersing the article, while still red hot, in a bath of oil heated to about 390° Fah., and letting it remain there until it had cooled down to that temperature. Glass thus tempered, while tough, seems to be at the same time very brittle, so that when it does break it flies into very small fragments, much like Prince Rupert drops. It appears to have a hard skin, bound tightly over a less hard interior. F. Lühisch, a German, now claims to have devised an improvement on the Bastic process. He immerses the article in a hot bath, heated only to about 220° Fah., but takes it out when it has lost its redness and cools it gradually and very slowly in an oven. He also uses a solution of starch or gum, or some similar substance which does not soil the surface of the glass, as fat or oil does. It is claimed that glass so hardened resists pressure or shocks as well as the Bastic glass, while at the same time it may be cut with a diamond or polished and engraved with the sand blast, a process to which the Bastic glass cannot be safely subjected.

IMPROVEMENT IN WATCH HANDS.—A device in the arrangement of watch hands has been patented, whereby the traveler may see at a glance the time, both at the place he is leaving and whatever local time he may wish to keep at a distance. The value to the traveling public of such a service is apparent in the facility it affords for making connection between trains run at different times, etc. The improvement consists merely in a convenient device whereby a thin hand may be placed upon the dial without any change in the movements of the watch.

POSTS AND GIRDERS.—A writer in *Wood and Iron* says that posts, whether for supporting floors or otherwise, should be bored from end to end to prevent dry rot by allowing a circulation of air. Girders should be constructed with two thicknesses of material with half-inch space between, bolted and keyed together at each end and in the middle.

SCIENTIFIC PROGRESS.

Parasites in a Fly's Tongue.

The microscope is constantly revealing wonder after wonder. The latest observation is from a microscopist at Cincinnati, who has been examining the anatomy of the common house fly, the tongue or proboscis of which he has ascertained is quite commonly inhabited by parasites. The operator had caught a fly, dissected it and taken out the tongue. The reporter of the *Cincinnati Commercial*, who was present, writes as follows:

Under the microscope the proboscis bore a decided resemblance to a rough, uneven log, overgrown with dark, thick moss, at one end of which were a number of black projections having the appearance of heavy spikes driven into the log, but which were in reality infinitely small hairs. It was certainly a formidable looking object in its magnified state. The experienced eye of the professor detected a slight vibration upon the surface of the log, and that particular specimen of fly-tongues was pronounced one of those for which we sought. The tongue was inhabited, and again the fly had proved a success. The operation which followed was one of extreme caution and skillful manipulation, and consisted in splitting the organ lengthwise, which was successfully accomplished under the small microscope, with instruments of most delicate texture, requiring the greatest care in their use. The operation resulted favorably, and sure enough the "critter" was there. He had taken up his residence for the time being inside the tongue, although it has been demonstrated that he possesses the power of roaming at his own sweet will either inside or outside of his field of operation. He was captured without much of a contest, and was imprisoned in a small drop of water, which was placed upon a glass slide with a concave center, and subjected to the searching revelations of the microscope. He appeared to take naturally to his new element, and manifested a surprising activity in his liquid quarters. He was pronounced by the professor to be a very handsome specimen. He was almost transparent, had a flat head and the body of a serpent. And how he did squirm, filling the entire space of his miniature aquarium with his writhings and convulsions. By actual measurement this one was found by Mr. Michelhorst to be 93/1000 of an inch in diameter. The greatest number he has ever found on a single fly's tongue was three—enough, in all conscience!

MIGRATION OF FISH THROUGH THE SUEZ CANAL.—Dr. Keller has communicated to the Swiss Geographical Society some interesting notes relative to the migration of fish by means of the Suez canal. It was at one time predicted that the interchange of fish between the Mediterranean and the Red seas would soon assume large proportions, but the prediction has not been fulfilled. Specimens of the smaller Mediterranean fish have been found in the Red sea, and for some unexplained reason the fish seem to travel in that direction in preference to the other. The most interesting circumstance noted is that the pearl oyster is slowly making its way toward the Mediterranean. Its progress is slow, but it is said to be moving in large companies.

RECENT FINDS IN THE CONNECTICUT VALLEY SANDSTONES.—Some new and very fine specimens of tracks are reported as having recently been found in the sandstones at Turner's Falls, in Massachusetts. Among the find is a bird track with a stride of five feet in length. Compared with a bird which made such a stride the ostrich would dwindle in proportion to a barnyard fowl. This new find in a new locality is considered a very interesting and important one. The entire region of the Connecticut River valley is supposed to have once been covered by the sea, upon the beach of which birds, quadrupeds, insects and various forms of vegetation have left their impressions. Compared with these tracks, as to age, the Pyramids of Egypt are hut as of yesterday.

DISCOVERY OF THE CARBON VOLTAIC ARC.—At a recent meeting of the London Physical Society Professor S. P. Thompson read some "Historical Notes on Physics," in which he showed that the voltaic arc between carbon points was produced by a Mr. Etienne Gaspar Robertson (whose name indicates a Scotch origin) at Paris in 1802. This reference is found in the *Journal de Paris* for that year. Laboratory notebooks at the Royal Institution, however, are said to show that Davy experimented with the arc quite as early. The experiment usually attributed to Franklin, of exhausting air from a vessel of water, "off the boil," and causing it to boil afresh, is found in Boyle's "new experiments touching the spring of the air."

SUN SPOTS.—Herr S. Wolff sends us to account for sun spots by a new theory. He thinks they may represent areas on the sun that are vastly hotter than the vast surface surrounding instead of being cooler, as astronomers generally believe. They are regions so extremely hot, he supposes, that the heat radiations have reached the intensity of ultra violet (red?) rays; these being invisible, the spots consequently appear dark.

Another Great Lake in Africa.

The discovery of another great lake in the interior of Africa is reported far to the west of Albert Nyanza. Occasional reports of such a lake have been current in scientific circles for some time, but it is only recently that any authentic data have been received. Recently F. Lupton, Governor of the Egyptian provinces of Bahr El Ghazal, has written to the *London Times* to the effect that Rafai Aga, an employe under his command, on his return from an expedition toward the Usilo, told him that he and some of the members of the expedition had seen a great lake in the country of the Barhoas, a powerful copper-colored tribe clothed with a peculiar grass cloth (of which Mr. Lupton sends a specimen in his letter). Mr. Lupton gathered that the position of the lake was in about 3 degrees 40 minutes north latitude, and 23 degrees east longitude, and that it was quite as large as Victoria Nyanza. When the weather permits, the Barhoas cross the lake in large open boats made out of a single tree, the voyage taking three days, and they obtain from the people living on the western side (their own country being east of the lake) articles of European manufacture, such as blue heads and brass wire.

Mr. Lupton gives in brief Rafai Aga's account of his trip to the lake, and concludes by saying: "I feel I should not be doing right in keeping dark this information, which, when looked into by competent persons, may throw some light on the famous Congo and Uelle rivers. I believe that the Uelle flows into the lake discovered by Rafai Aga, and that the stream which is said to flow out of the lake probably joins the Congo." Mr. Lupton further informs the *Times* that he is engaged in preparing a map of this province, and that he was about to start in a few days on a journey to a country called Umhungu, some 15 days' march to the west of Dehm Siher.

Electro-Generative Fuel.

At a recent meeting of the French Association for the Advancement of Science, Dr. Brard, of La Rochelle, read a paper before this physical section in which he described a new method of generating electricity by the combustion of a peculiar kind of fire-slab. This slab consists of a brick of carbonaceous matter and a brick of nitrate of soda or nitrate of potash, placed together, but separated by a thin sheet of asbestos paper, and both enveloped in a wrapper of asbestos. The carbon brick is formed of about 100 grams of coal-dust kneaded into a paste with tar or molasses, and shaped in a mold by heat. The mold gives the brick a pitted surface above and perforates it with holes through and through from the upper to the under side. Strips of brass or copper are also imbedded in the under side of the brick to serve as an electrode for the carbon pole of the electro-generative element. The other brick consists of a mixture of three parts ashes and one part nitrate of potash or soda melted together and poured upon the pitted surface of the carbon, which, however, is first covered with a layer of asbestos paper. Strips of brass are also imbedded in this compound to serve as an electrode. The elash thus formed constitutes a generator of electricity when wrapped in asbestos and placed in a furnace or over a fire. In such an element the carbon forms the negative plate and is oxidized just as zinc is oxidized in the ordinary voltaic cell, the nitrate of potash being the oxidizing substance. The slab becomes a thermo-chemical battery, and Mr. Brard states that an electric current is obtained strong enough to actuate an ordinary electric bell. By connecting up several of these elementary slabs after the manner of a voltaic battery, a more powerful current is the result, three or four cells being sufficient to decompose water.

TREMORS OF THE EARTH.—The *London Times* publishes a synopsis of some papers on the "Tremors of the Earth," by the committee appointed to measure the lunar disturbance of gravity and by Mr. G. Darwin, which contains some statements new to the public. It is considered proved by the men of science engaged that the crust of the earth heave under the weights imposed on it till, "when the barometer rises an inch over a land area like that of Australia, the increased load of air sinks the entire continent two or three inches below the normal level." The land actually sinks and rises under the pressure of the mass of water thrown upon it by the tides; the maximum of rise and fall on the Atlantic seaboard reaches five inches. The effect is felt at the bottom of the deepest mine, and may reach for an unknown distance. It follows that the crust of the earth must be of exceeding tenacity, exceeding as a minimum that of granite, and its swaying may be the causes of phenomena hitherto quite unexplained, as, for example, the relation between storm and earthquake. So universal, frequent and unavoidable are these disturbances that the inquiry into the lunar disturbances of gravity has been given up. No depth can be found at which a recording instrument can be placed so as to escape their effect. The round earth pants, in fact, like a breathing being, under changes always going on above her.

PEBBLE-LOADED WATER exerts an astonishing erosive power. In one hydraulic mine a pebble-loaded stream, working eight months in a year, has in four years cut a channel in solid slate rock 3 ft. wide and 50 ft. deep, according to Packard.

MINING SHAREHOLDERS' DIRECTORY.

MINING SUMMARY.

ASSESSMENTS STOCKS ON THE LISTS OF THE BOARDS.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

ALPINE.

ISABELLE.—*Monitor-Argus*, Dec. 29: In our last issue speaking of the Isabelle G. & S. M. Co., we erred in stating that ore is being taken from a depth of 40 ft. below the top.

mine level, but should have read that the shaft was down 4 ft under that level. The shaft is now sunk 60 ft below that level, and it is the intention to sink another 50 ft before drifting, making 248 ft from the surface. Since our last issue the mill has been started up; also the hoisting works at the Stella mine.

AMADOR.
See — *Amador, Timothy*. Dec. 87; D. Fulkner and th

Gold.—Amador Sentinel, Dec. 21: D. Fulcher and the Bartlett Bros. shipped on Saturday to San Francisco nearly \$1,900 in gold dust, the product of their gravimism at Slabtown. This looks as though Amador county placers were not yet played out.

JACKSON.—Amador Ledger, Dec. 29: Messrs. Peck and Smith arrived in Jackson the middle of last week to make personal investigation and inquiries concerning the condition of this mine. The water was hauled out the same

day, and the parties went down the shaft and viewed the ledge from whence the rich ore, studded with free gold, was extracted the week before. A quantity of the ore was put in a sack and sent below for the inspection of the parties there. It is said that F. M. Brown, former superintendent of the Amador canal, but now of San Francisco, and who has amassed considerable wealth since leaving Amador county by fortunate mining ventures in Colorado, has some thought of embarking in the property. After the spasm of activity, the mine fell back to its previous condition, under attachment, and

change of the mill. The Amador Con. has levied an assessment of 50 cents per share, delinquent January 26th. W. A. Nevills, who, for several months past, has been working on the Spanish Gulch or Mammoth quartz mine near Middle Bar, has taken out some very rich ore, and from all accounts, he is still in quartz of high grade. There is a 10-stamp mill on the property, but it has not been started yet. It is expected to be put in motion shortly, and there is abundance of rock to keep it running. Bartlett's group claim a claim in the spring of 1894. The initial group-up was made lately which proved highly flustering. The auriferous ground will require two or three years to work out.

EL DORADO,

NOTES.—*Mountain Democrat*, Dec. 29: Last Saturday J. E. Lyoo brought down a couple of "goose eggs," the result of a 15-days run at his Mount Hope mine, near Grizzly Flat. The two weighed a fraction over 1½ lbs, and were worth about \$3,150. This was the third clean-up the Mount Hope since the new 10-stamp mill was put up. The mine is paying about \$5,000 per month over all above expenses. Chamberlain's is operation at timber.

above expenses. It is this now in operation at Grizzly and vicinity are regularly turning out upwards of \$10.00 per month. A short time ago 450 lbs of ore from the Albambra mine, Kelsey township, owned by R. H. Ded J. Q. A. Ballard & C. H. Weatherwax, of this city, was sent to Prof. Thomas Price, of Sao Francisco, to be tested. Last week the Professor's return was received, showing a yield of \$2 300, or a fraction over \$5 a pound, \$10,000 p

A RICH COPPER MINE.—W. H. Kesfer, the indefatigable and persistent prospector, came over from Georgetown and has been in Placerville several days, and at Alder drug store he has deposited a considerable lot of fine copper ore taken from a ledge near Garden Valley, which

recently discovered and has partially developed, which he, E. H. Watson, of Georgetown, and others are the owners. He exhibits samples of high-grade sphurated ore, of which he reports a solid ledge 4 ft thickness. Contiguous to this, next to the foot-wall, an 18-inch vein of loose "peacock" ore, which can be freely shoveled up without blasting or picking, and which is even richer than the main ledge. Next to the hang-

wall is a large ledge of quartz, freely interspersed with copper ore, from which also a good prospect in gold is obtained. His location embraces 3,000 ft adjacent to the old Isbell mine, and is in the close vicinity of the ore from St. Lawrence. He has sunk a shaft about 4

A FINE NUGGET—Seth Loveless, on his last trip down from Consumes township, brought with him a bandoleer nugget, weighing a fraction over 2 ozs, recently taken out of his claim, near Brownsville, by Capt. G. S. Clagho, who has taken out many of similar size during the past season.

SOUTHERN INFO.—*Cor. Independent, Dec. 30:* The burning of the Pascamint mill on the evening of the 19th was a serious disaster to this section. The mill had just completed a most successful run of about 6 weeks, the result of which had been estimated at nearly \$50,000, all depending on the prosperity of the camp, when fortune, turning its flood-tide, destroys the mill, and for a time checks the progress of a company who were aiding much toward the prosperity of Inyo. However, as one camp meets with reverse, there are coming forward to sustain the business of the county.

SHERMAN DISTRICT—This district is still moving ahead and the camp, now called Reilly, presents a lively appearance. Some 60 men are employed in and about the mine grading for the mill and erecting buildings. A store, 14 by 54 ft. and 1½ stories high, is being erected. Two

clines are being run on the Bonanza King, and below to mine a working tunnel. The lowest depth reached the main incline is about 130 ft. The company has several men at work upon three other mines—the Natchez, South Point and North Star—with the object of putting them in working order. The history of these mines,

though brief, by no means lacks interest. They were patented, in 1875, by the Wibbsett brothers, who held possession of them and did sufficient work upon the various claims to show that they possessed the merit of having a rich class of ores. At various times they had ore work

that yielded some 250 ozs or more per ton. This, after time, attracted the attention of Mr. John Ely, who placed them, undeveloped as they were, before the Eastern market. In the early part of last spring Mr. Edward R. of New York, made an examination of the mines, and

developed as they were, concluded to take them, some in number. Mr. Reilly visited the mine in October, and immediately ordered the erection of a 10-stamp mill, and upon his return to New York took steps leading to organization of a company. A few months more and

DOINGS AT OTHER CAMPS.—At Snow's canyon Hunt

enough is accumulated the mill will start on a run some 250 tons of gold ore. At Lookout Fitzgerald stands up his furnace on a run of some 250 tons of ore, and mining with an accident was compelled to close down and

der some new water jackets, which will soon arrive, when he will resume smelting. Chloriders and miners at Darwio are actively at work, and the approaching year bids fair for a season of prosperity.

THE MURCHIE MINE.—Nevada Transcript, Dec. 27: 'Murchie mine is looking splendidly, the ore deposit never having made a more encouraging appearance. Next week the work of adding 8 more stamps to those already in operation will be commenced.'

NEW HOISTING WORKS.—Lawrence & Barlow, the contractors, have a good start on the building for the water-power hoisting and pumping machinery at

Sherman Cor. mine. They expect to have everything in readiness within about 30 days, at which time the South Yuba Company contemplate getting water down to them via the Quaker Hill ditch now being constructed.

PLACER.

FOREST HILL.—*Cor. Placer Herald*, Dec. 29: Our mines seem to have caught the infection. For example, the Paragon, which a year ago employed 40 men, now only gives employment to 6. The Napoleon, which 20 earned their daily bread, shut down two months ago, or rather the men quit work, as nearly two months' pay was due them. It may doubtless be started again. The Mayflower and Dardanelles are waiting for their patience and perseverance. That their efforts may be crowned with success is the sincere wish of all in our country. The Baker Divide mine deserves honorable mention.

PLUMAS.

BAY STATE AND STEAMBOAT MINES.—*Greenview Bulletin*, Dec. 23: These claims were formerly known as the Yellow Jacket and White Ledges, and for a long time after first being located nothing was done upon them. During the summer the present owners have put down about 75 ft. of shaft and run 100 ft. of tunnel and drifts. At the surface the ore from both of the ledges prospects very rich. The tunnel now being run was started down the mountain side below the shaft, and will strike the ledge at a depth of 25 ft. from the surface. Every 34 ft. of tunnel gives 2 ft. of backs, the ground being very steep. The same parties own the Monumental claim in the same locality. This they have also been working upon by both a tunnel and shaft. The latter has so far yet to run before it will strike the ledge. The ore in the shaft prospects very well, the gold being distributed evenly through the rock.

GRANITE BASIN.—*Cor. Plumas National*, Dec. 29: At present there is but little hope of gold, but we think within the next 12 months our little camp will have more quartz mines running than have been worked for years. All work has been suspended for the winter, aside from a little prospecting or assessment work, and many have gone out to spend the winter, with the intention of returning in the early spring. There are three families who intend to winter in the Basin and enjoy the "beautiful snow." A few weeks ago the miners of the Basin, pursuant to a call, assembled together and organized a mining district, of 7 miles square, the name of the district being "Granite Basin Mining District." They also adopted a list of district mining laws and elected a Recorder. Hereafter all claims located in the district will be recorded upon the records of this district as they should be. A copy of the mining laws of California mining district was submitted and adopted with but a portion of one section left out. A Davidson was elected Recorder. Although times are dull just at present, we think the outlook for the near future is very favorable, and that our little camp will be one of the successful quartz mining camps of California. The process heretofore used in this locality has not been in any way adapted to the quartz of this district. Parties who came here last August thoroughly examined the quartz, and satisfied themselves that by milling the rock with the proper process for saving the metal, good results, and in paying quantities, could be obtained; also claiming to have a process to work the ore successfully. About the 1st of September Davidson and Lyon bought mining property here, and since that time have been engaged in fixing up machinery preparatory to making a start, towards testing the mines and the process by which they intend to work the rock of this district.

MEADOW VALLEY.—*Cor. Plumas National*, Dec. 30: Everything in this locality is slow. The water has been favorable, but nothing to do since the Monte Cristo mining company was sold out, and times have been down. Edman & Co. are closed up for the winter. Hanson & Andrus are running a tunnel upon the southeast extension, and Bill Smith is prospecting the northwest extension of the Edman ledge. Meadow Valley is as usual, some improvements going on and others in contemplation. R. Jacks is rebuilding his saw-mill. Several residences have been erected on the road-beds between Meadow Valley and Spanish Ranch. Silver Creek mining is closed for the winter. The P. M. & W. Co. are in readiness for water, and have everything complete for a big and long run, should the elements furnish the necessary power. The Orr company has been running, so I am informed. Reports from the river are that times are dull—all, with few exceptions, laid up for winter. How different it might be if some of our selfish moneyed men would only organize a company on purely business principles and build a narrow gauge railroad up said river from Oroville to Quinn. Instead of saying, "Laid up for winter," business would flourish the year round, and all the bars, hotels, etc., on the entire route would be decked with cottage homes and orchards, and instead of less than 100 inhabitants, one or more thousands would be there, and then the untold thousands that remain in the deep and back channels could have machinery placed upon them to advantage, and fortunes could again be made. Besides, it is the only true and feasible route over the Sierras.

SHASTA.

IAO.—*Shasta Courier*, Dec. 30: E. L. Ballou, as well as Crum & Hubbard, are running arrastras and making for themselves a rainy day for many days. Their mines have paid well, and they are satisfied with the outlook. At the Bullion mine, owned by Robinson Bros., everything was working well, and, as a result of good financial returns, the boys were all happy. Honniken & Co., at the Continental, are doing good work and receiving good returns, having plenty of good paying ore on hand. While at Cooper's mine the filthy lure was being extracted from the earth in quantities that remunerate its owner sufficiently for the labor and effort expended, these mines are not what are termed bonanza mines, but are like many others in the county, paying very good wages for effort put forth, and giving to their owners by gradual accumulation efficient returns to enable them to live at ease in after years.

SIERRA.

FOREST CITY.—*Sierra county Tribune*, Dec. 23: The Bald Mountain company is working the usual number of men. Gravel that prospects \$2.30 to the car was struck last week in a tunnel running west from Lowell avenue. This development will result in the company opening out a large piece of ground in a quartz where such prospect was not expected. The Ruby mine continues to pay well, and is being opened out so that a large crew of men can be put at work next spring. The Extension company are prosecuting work in their usual energetic manner, and are very confident in reaching pay again soon. The Arizona company, composed principally of Forest City gentlemen, feel jubilant over the late decision rendered in their favor by the Supreme Court. The Ruby mine, where it is, the company propose to begin work early in the spring.

CHIFFS FLAT.—The Rainbow mine is in full blast and is doing well. Some \$90,000 has been expended by the company this summer in making outside improvements and in developing the mine. The hoisting works are no longer used, but the entire work of the mine is now carried through the new tunnel. At the entrance of the tunnel there have been erected a blacksmith shop and a dump house. Ore is transported from here to the mill by a Halliday tramway. The company intends sinking on the ledge from the new tunnel soon. A Corliss engine and steam pump that is to be used for that purpose is already at the mine. The Rainbow has yielded about \$270,000 of bullion during the past year, which is not a bad showing by any means for a low level. The writer is under no obligations to Supt. L. Irwin for favors.

ALLEGANY.—But few changes have occurred at Allegany during the past summer. Our friends are still there awaiting the development of a "mining boom," which they anticipate will come ere another year rolls around. The Golden Gate mine is still lying idle, with but little prospect of being worked up very soon. It was expected that work would be resumed on the Harlem mine

during the summer, but for some reason it was not. Frank Hauber has really found a bonanza in a quartz ledge. For several months he has been prospecting the ledge, and from nearly the first found the most favorable results. A sack of ore recently shipped to San Francisco assayed \$270 per ton. Mr. Hauber has considerable more of the same kind of rock on the dump. T. H. Sni has also prospecting a ledge that promises to develop into something worth owning. The Buckeye gravel mine, owned by Messrs. Hackett, Patton & Barnhart, has paid well this year. From Will A. Hanly, who has the Golden Star drift mine leased, we learn that a body of blue gravel was recently encountered in that claim that promises to develop very favorable.

MINNESOTA.—*Mountain Messenger*, Dec. 30: Considerable mining still continues in this old time camp. San Ireland is vigorously pushing his bedrock tunnel ahead to prospect his quartz ledge, courting east and west, as well as Rainbow, now in 900 ft. An air tunnel is being put in a distance of 175 ft. that will require about four months' time. This will be then extended 150 ft. further to tap a second ledge, parallel with the first. Two years ago Mr. Ireland panned out with a band mortar \$8,000 from his rich quartz. Near by, in early days, \$5,000 was taken out of one shaft, and from another over \$8,000. San is hopeful of discounting this, as he is patiently awaiting the results of his work. The Yearling mine, San Ireland's rich finds. The Wisconsin gravel company, M. Post, Esq., superintendent, employ 5 men, doing very well this winter, with flattering prospects for the future. W. W. Cooper is now 800 ft. in soft bedrock with his tunnel, and may strike through into gravel any minute. A bedrock tunnel is being run into the Swanee gravel claim. Plumbago and Hope quartz ledges are not being worked at present. Attention is being given to the Fellows' quartz ledge, owned by Eastern capitalists.

NEVADA.

WASHOE DISTRICT.

MEXICAN.—*Entreprise*, Dec. 30: Good headway is being made in the joint Union Consolidated east crosscut. It will be advanced some 20 ft. this week. As yet no special change of material has been noted. The joint Ophir winze is now within a few feet of the 3,000 level. It will reach said level next week. Yesterday quartz was again coming in at the bottom, showing that the lump of porphyry encountered two or three days ago was a boulder.

HALE AND NORCROSS.—The joint Savage drift on the 2000 level is in a distance of 30 ft. The face is in a mixture of quartz and porphyry, which carries a small amount of metal. The ground is soft, and requires to be closely timbered. Since striking the quartz there has been a slight increase in the water. The drift has been cut, the drain boxes are all in, and the water does not interfere with the operations of the workmen.

SAVAGE.—The joint Hale and Norcross drift on the 2000 level is now out some 30 ft. in Hale and Norcross ground. Day by day yesterday a considerable amount of quartz of good appearance, and carrying some metal, made its appearance in the face. This ground is soft, and requires to be closely timbered. When the quartz came it brought in a small increase of water. The drift will be pushed ahead to the Savage line as rapidly as possible.

SIERRA NEVADA.—A new east crosscut joint with Union Consolidated has been started on the 2000 level. The east crosscut on the 2700 level is out some 30 ft. From this point it will probably be necessary to keep a hole drilled ahead, in order to guard against water. The winze from the 2300 down to the 2100 level is being overhauled and repaired.

CALIFORNIA.—Work at the face of the joint Consolidated Virginia southeast drift has been discontinued, in order to cut a drain and properly timber up. Some very promising streaks of quartz, that carry metal, have made their appearance in the face of the drift. The work of overhauling the machinery and apparatus at the C. and C. shaft is about completed.

CONSOLIDATED VIRGINIA.—The southeast drift on the 2700 level, joint with California, is being timbered up, and a drain being cut in the bottom. Streaks of quartz that yield assays have made their appearance in the face of the drift. The surface machinery at the C. and C. shaft is being overhauled, and will be in good repair by the first of next week.

OPHIR.—The main south drift on the 2000 level has crossed the north line of the California ground. The joint Ophir winze will reach the 3,000 level next week. After having passed through a boulder of porphyry, the bottom is again in material largely composed of quartz.

BEST AND BROUGHTON.—Work has not yet been resumed in the north drift. The ground ahead seems to be quite wet, and it is still being allowed to drain out through the drill hole. The flow from the hole is gradually diminishing, and there is not now much pressure.

YELLOW JACKET.—The amount of ore extracted from the old level at the Winters shaft is being steadily increased.

BRISTOL DISTRICT.

STRIKE.—*Picacho Record*, Dec. 27: There has been quite a little strike of ore made in the No. 2 mine of Bristol Co., owned by R. C. Barton & Co. The report is that the ore goes \$50 per cent. lead and from \$100 to \$300 in silver. A new shaft was being sunk on the claim, where there were indications of ore, and at the depth of 6 ft. this new find was encountered. We hope that the report is correct.

WILM START UP.—The Bristol S. M. Co. is preparing to start up its mill on tailings. Mr. Goodhue was in town during the week, employing hands. The Bristol Co., at no distant day, will again be working under full force.

CENTRAL DISTRICT.

PINE ORE.—*Silver State*, Dec. 26: Alex. Wise returned from a visit to his mine at Central yesterday. He says they have at last a new formation in the Keystone shaft, and the ledge carries 3 ft. of sulphure ore, but he cannot tell how rich it is, as none of it has been assayed yet.

CHERRY CREEK DISTRICT.

THE STAR MINE.—*Eureka Sentinel*, Dec. 30: Cherry Creek is still a bustling little camp, in which everybody seemed to be employed, and to have some money for the necessities, as well as the luxuries, of life. The main shaft, which is being run by the 10 stamps, is now in dry running, and running at full capacity, but not at a profit just now, as the most of the ore being reduced is of low grade and does not pay. Of this character of ore, from \$0 per ton down, there is a vast quantity in the mine. At present Mr. Foulke, the superintendent of the property, who is a very intelligent gentleman is experimenting with 1 stamp, wet crushing and concentrating. He has not completed the experiment, but he has had good success. It is to be satisfied that by the use of a series of blanket sluices and a pair of reservoirs, in which to save the sediments, that he can save 10 per cent. of the assay value of the ore, which has hitherto been lost. If he succeeds in this, as he confidently believes he will, it will assure the Star mine a splendid future and Cherry Creek a long life. The process employed in the mills hitherto, and which the 10 stamps are now run, is dry crushing and rearing. Cherry Creek enjoys peculiar advantages, and if Mr. Foulke works out the problem of reducing his low-grade ore profitably it will be a fine town for business. It is what Stephen Gage calls a "competitive point." Being so near Utah, it can get its supplies from Salt Lake if the C. P. refuses low rates of freight. These rates it gets on freight hauled from Toano. Wood is very cheap. Machinery is abundant at \$0 per cord, and a splendid quality of nut pine at \$5.

COLUMBUS DISTRICT.

NORTHERN BELLE.—*True Fissure*, Dec. 23: A distance of 10 ft. has been advanced in the new shaft from the 5th shaft level during the week. It is now down 4 ft., and shows a much harder formation than at the time of the last report. The streak of sulphurets encountered has passed entirely out of the winze. There is quite an improvement on the fourth shaft level, the ore body having advanced considerably as well as improving in grade. The main drift on the first shaft level has been extended 15 ft., and the slope above this level is now looking finely,

showing no diminution either in the quantity or quality of the ore produced. The other shaft levels present about the same appearance as last week. In the levels above the 4th there is no important change. The ninth and tenth levels are looking well, and continue the usual yield of ore. All work in and about the mine is progressing favorably. The daily output of ore has been about 65 tons. Work has been resumed in mill No. 2, which was started up on Monday, the necessary repairs having been made meanwhile. Mill No. 1 is closed down, and a complete clean-up will be made in it as soon as possible. The haulage shipments amounted to \$18,654.31 for the week ending December 25th, and a total of \$61,237.45 has been made so far this month.

COLUMBUS CON.—The usual amount of work has been accomplished on this property during the week. The west drift on the first level is now in a distance of 90 ft. At this point an improvement has been started on the ore body. The east drift, on the second level, has reached a length of 62 ft., and is showing a ledge of high-grade ore 18 inches in width. There is no change worthy of note in the west drift, which is now 23 ft. in length.

COMO DISTRICT.

EUREKA.—*Lyon Co. Times*, Dec. 29: Antonio Petacna, the locator and proprietor of the Paymaster, returned to Como about a month ago, and has since been in conference with the mine, Mr. Petacna reports that San Francisco capitalists are keeping posted in regard to Como and the developments in the Eureka, and that if this mine fulfills its present promises there will immediately be a rush of capital to the camp.

EUREKA DISTRICT.

ALEXANDRIA.—*Sentinel*, Dec. 29: The Alexandria Co., hitherto operating the Alexandria mine on Prospect Mountain, has purchased a number of claims lying south of and adjoining their property, known as the Sterling series. The latter has been operated for several years by Adam Hall, who, unaided, except by means realized from the sales of ore taken from his mine, has done an immense amount of work on the ground in running tunnels, sinking shafts, driving drifts, crosscuts, etc. All very trustworthy. Mr. Hall has stuck to his claim through a period of many years, relying on a good credit to carry on the work of exploration when money gave out, and has at last met the reward his energy justly deserves. The work of development upon the consolidated mines of the Alexandria Co. will now be pushed ahead as fast as possible, with a plenty of money to back it. The hoisting engine lately placed upon the Alexandria mine is being removed to the Diligent shaft, now down to a depth of 100 ft., and which will be carried down to a depth even with the level of the Eureka Tunnel, with which connection is to be made by a drift about 500 ft. in length. This will give to three mines, the Alexandria, El Dorado Con. and the Eureka Tunnel, a perfect system of ventilation, cheapening and facilitating the work of development in all of them. The Alexandria mine has yielded large amounts of high and low-grade ore, and the Sterling has been a bonanza mine. The latter the present owners are wealthy merchants of Detroit, Mich., who, from the intimate knowledge we have of the mines, we feel assured will not have reason to regret the investment they have made.

JACKRABBIT DISTRICT.

WORK.—*Picacho Record*, Dec. 27: Considerable work is being done on the Jackrabbit district. John C. Lynch has a force of 5 men working on the Cottontail mine, which is looking very favorable.

SILVERADO DISTRICT.

ONE SUMMIT.—*Eureka Sentinel*, Dec. 30: Foley and Kilgore shipped yesterday to the Kurks Con. reduction works from the Fairplay mine, Alameda Hill, Silverado district, 14 tons of ore—4 tons of first-class and 10 tons of second class. The first assayed \$200 per ton and the second \$80. The mine looks very well.

SWEETWATER DISTRICT.

QUINN.—*Cor. Esmeralda Herald*, Dec. 30: The Summers mine starts up to-day with a full force, and Messrs. Bennett & Reddy, as co-owners, representing one-fifth of the mill and mine. The property never looked as well as it does at present. Four hundred tons of very fine ore await reduction at the mill, which is having its amalgamating capacity enlarged by the addition of two pans and a settler, which were formerly belonged to the old Moses mill at Pine Grove. Everything in mining circles here has been very quiet during the last few days, owing to the many attachments levied on the Summers property; but the gloom that has prevailed has been dispelled, which makes the heart of the average prospector buoyant with hope. It looked at one time as though we were to have a lawsuit of no small proportions to determine the title to the Summers mine. The laws of the country, though founded on reason and sanctified by the wisdom of centuries, afford but a feeble and inadequate protection from the claims of those who shirk the burden and labor of prospecting, and emerge from obscurity to claim the fruit produced by the industry and perseverance of others.

TUSCARORA DISTRICT.

ELRO COS.—*Times Review*, Dec. 28: Main drift of shaft No. 1 has been advanced a distance of 3 ft. The formation still continues hard, but favorable.

NORTH BELLE ISLE.—Total depth of the shaft to date, 290 ft. Suspended work on the 25th inst. to replace some tubes in the hoiler and make some repairs to the machinery.

INDEPENDENCE.—Total depth of No. 1 shaft, 193 ft; progress during the past week, 5 ft. No change in the vein or grade of ore. West crosscut, 200 level, extended 15 ft. Stamps are yielding some good ore.

NAVAYO.—Crosscut, 450 level, extended 12 ft. Formation looks encouraging. No change to note in the stopes. They are producing a good grade of ore at all points. Have resumed work in the south drift on the east lateral vein, 350 level. The vein is yielding some very rich ore.

GRAND PRIZ AND ARGENT.—East drift, 700 level, is in 240 ft., and west drift 350 level, 210 ft. The latter is yielding very fine material. Argentine vein 63 ft. deep. Have changed the grades under all the boilers, and are now using coal, which gives very satisfactory results. Will now get in the plunger pump in the bottom of the shaft, and take out the steam pumps, which will save a great deal of fuel.

WASHINGTON DISTRICT.

A GOOD MINE.—*Esmeralda Herald*, Dec. 28: Oliver Peartree, of Washington district, East Walker river, was in town Monday. He has 5 men employed extracting ore from his mines, some of which he concentrates himself and the balance he ships to Dayton to be worked.

WILLOW CREEK DISTRICT.

ORE.—*Silver State*, Dec. 26: Last week the Silver State reported that a body of fine ore had been found in the Iowa mine at Willow Creek. Joseph McColey, one of the principal owners of the Ohio mine, in the same locality, arrived in town Saturday, and confirmed the report. He says two men break down from 4 to 6 tons of \$100 ore in the mine on a shift. The extent of the ore body is not known, but the appearance of the lead indicates that there is a large body of ore. The Ohio mine is also looking well, and now that there is a mill in the district, it is expected that there will be regular shipments of bullion during the winter, unless the weather is too severe to get ore from the mines, as roads have yet to be built and fuel procured.

GOOD MINING PROSPECTS.—*Silver State*, Dec. 27: E. E. Burr, who arrived here yesterday from Willow Creek on his way to New York, reports that the Willow Creek mines are prospecting better than the most sanguine expected. In addition to the fine body of ore found in the Iowa mine, good ore has been struck in the Missouri and Red Rose mines, and the prospects are very encouraging. In the Shrewsbury mine also the ledge looks well and carries considerable ore. The Silver Wave mill will be started this week to test the machinery, and will commence crushing ore immediately after New Year's day.

ARIZONA.

FOUND ORE.—*Arizona Citizen*, Dec. 29: The Commonwealth M. Co., of Los Caecias, after having expended some \$1,500 in prospecting their mine in Wood Canyon, have found on the 120 level a vein of ore, the average assays of which are \$200 per ton, gold and silver. The average width of the ledge is 6 ft. Many had given up on the Commonwealth Co. had worked so long—almost one year—without finding anything. But now all have greater faith in the future of the camp, and know that the intelligent and persevering work will bring the camp from a dying condition to the lead of the go-ahead camps of the Territory.

CLIP MILL.—*Arizona Sentinel*, Dec. 23: On the first steamer that leaves here the machinery and supplies for the Clip mill will go up. The mill will be erected at Clip Landing, which is about two miles above Red Rock Gate. The mill will be of 10 stamps, 4 pans and 2 settlers. There is power enough to work 10 additional stamps when required. Mr. H. Shipman, one of the owners of the Clip mine and mill, will personally superintend the erection and running of the mill, and expects in six weeks to begin crushing ore. Men are at work grading the road between the mine and the millsite, a distance of about six miles. Reports from the Clip mine are very encouraging. That old-time Arizonian, Mr. A. G. Hubbard, is in charge of the mine, which is a sufficient assurance that the property is well managed.

COLORADO.

UNKNOWN.—*Georgetown Courier*, Dec. 19: From 5 to 11 inches of pyrite, gray copper, and galena has been encountered in this ledge, on Griffith mountain, which mills \$100 per ton.

DIVES.—It is said that Von Brandis & Co., lessees on the East Dives, have a fine vein of ore in the bottom level, which runs well enough to make them feel happy.

CUCKOO.—A lot of coarse galena, carrying rich minerals in the disintegrated portions, was struck in the Cuckoo lode, Republican mountain, last Saturday. It contains 65 per cent. lead, and will mill about 100 ounces silver per ton.

ERNEST STAN.—A very acceptable Christmas present in the way of a big strike in his Vice President mine on Sherman. He has about 3 to 4 inches solid mineral, consisting of galena and gray copper, which runs something like 500 ounces of silver per ton.

CONCORD CRY.—The Diamond Tunnel has cut a 5-ft. vein of mineral at its intersection with the Corry City lode, which assays from 42 to 821 ounces silver per ton. Work will be commenced on the vein as soon as the tunnel head is far enough advanced to admit room.

KOHINOOR AND DONALDSON CONCENTRATOR.—On Wednesday morning of last week, a short distance below the mouth of Fall river, ground was broken for the foundation mill in the Rocky mountain area. The new works are to be erected by the Kohinoor and Donaldson M. Co., the latter corporation which lately has acquired extensive mining properties in Gilpin and Clear Creek counties. The mill will have a capacity for treating 200 tons of ore per day, which will be furnished by the Donaldson and Champion mines, the former being on the south side of the creek and the latter on the north side, each of which will be connected with the mill by wire tramways. The machinery will consist of Hartz jigs and fine vanners, with which the ore has been tested with excellent satisfaction. A contract has been made with Fraser & Chalmers, of Chicago, for the entire plant of machinery, and the works will be pushed forward to completion with all possible dispatch.

IDAHO.

BULLION.—*Silver City Avalanche*, Dec. 23: The largest shipment of treasure at any one time for many years passed through this place last Sunday, in charge of Wm. Paxton, Wells, Fargo & Co.'s messenger, on its way to Winnemucca. We are informed that the value of the shipment was nearly \$30,000.

Most of the ledges in this vicinity are looking well, and considerable ore is being extracted, yet there is not a mill running in camp. Most of the owners of mines have relied upon the winter fresh snow enough, to make good sleighing. So far they have been disappointed, as there is neither wheeling or sleighing, and as a consequence the mills are all shut down for want of ore.

ORO FINO.—*Nex Perce News*, Dec. 21: Mr. Keane, who came down from Oro Fino last week, informs us that the times in that camp have had the poorest season for years, owing to the limited water supply, but they are sanguine of doing well as ever next year. Several locations have been made by new comers on the agricultural lands adjoining the Wee-wee, and the new settlement on Whiskey creek is still flourishing. There is a bright future in store for old Shoshone when the Nex Perce reformation is opened, and time will prove that we are right in asserting that north Idaho is the foothills of the promised land.

MONTANA.

BUTTE.—*Miner*, Dec. 29: At the mines advantage has generally been taken of the holiday season for a general clearing up and reorganization of the works, and the effect of a general relaxation from vigorous production of work is evident in the decreased volume of bullion shipments.

MOULTON.—A full force had been worked up to last night, but the ore house being full to its utmost capacity, the mine will be shut down until after Christmas. During the week a winze has been started from the 200, at a point 200 ft. east of the mine shaft, and the work under the body of ore is being done in sinking that shaft. A 2-ft. vein has been uncovered in the new winze, which mills 50 to 60 ounces.

THE ORIGINAL has been getting ready for active sinking work. The mine has heretofore been worked only to the 200 level, but the shaft had reached a depth of 240 ft. The 40-ft. sump had become filled up, and the work during the past week has been confined to clearing it out.

ALACE.—Development work has been prosecuted on the 700, and stopping as usual on the upper levels.

A LAROE force is working the Magna Charta, and 40 tons of ore per day are hoisted. The high-grade ore mentioned last week as being uncovered in the north drift of the 200 and 300 holds out as to quantity and grade.

M. C. & V.—Working during the week has been principally confined to sinking and development. The strike in the 118 level holds out strong, and it is believed will prove one of the most valuable discoveries in the mine.

NEW MEXICO.

BLACK RANGE.—*Cor. New Southwest*, Dec. 29: Having just returned from a prospect over the country on the east side of Black Range, a few items regarding this now bonanza Territory might prove interesting. Chlorite is fast developing into a fine camp. It is growing rapidly. Its mines are being opened to their advantage, and the mining is going on. Among the best mines are the White Sulphur, Wall Street and Colonial. Nearly every canyon (from one to two miles apart) running east from the summit of the Range has its good mines. The Princess, on the Cave creek, has a fine showing of sulphide ore. It has 2 ft. of the vein matter claimed to average 100 ozs. Thomas C. Archer, one of the best posted prospectors in the country, has some very fine prospects in this Territory. He is going to the next gulch south are the rich mines of Charles Van Alstyne. His best mine is the "Ingersol." This claim shows from 15 to 24 inches of partially decomposed quartz, lying between perfect walls. Character of ore is sulphides. The formation is porphyritic-granite. On the middle Percha we find the famous Solitaire and St. Clair mines. The Solitaire vein has at last been found. It is wonderfully rich. Many other fine prospects are lying undeveloped on this level.

The Denver Exposition—No. 19.

[Editorial Correspondence.]

The Nevada Exhibit.

The ores and minerals on exhibition at Denver from the State of Nevada, although few in number, small in bulk, and packed away almost out of sight in one corner of the building, nevertheless, to the mineralogist comprised one of the most interesting collections in the entire Exposition. The collection embraced nearly all the valuable minerals and metals known to science. In no other exhibit could a person gaze upon ores that have been extracted from a depth of over half a mile beneath the earth's surface. In that exhibit were to be seen free milling ores from the Comstock; smelting ores of varied character from Eureka and Esmeralda counties and from surrounding districts; roasting ores from Austin, Ophir, Cornucopia, Tuscarora, Lewis, Humboldt and Esmeralda counties; copper ores from Lander, Washoe, Nye and Esmeralda counties; horn silver from Tuscarora, White Pine and Esmeralda; gold from Paradise, Tuscarora, Virginia City, Lewis, Eureka and White Pine districts; stephanite, ruby silver and chloride ores from Austin; stettinite from Nye county; garnets from White Pine; native copper from Lander and Esmeralda counties; mineral soap from Elko; salt, borax and soda from Esmeralda county; niter and sulphur from Humboldt county; nickel and cobalt from Nye county, and iron ores from various portions of the State.

No other State or Territory represented at that exposition exhibited refined or crude borax. Nevada presented a fine display of refined borax, borate of soda, borate of lime. Cotton balls and tinkle in large hermetically sealed glass jars were exhibited from the famous Teels Marsh deposit, of Esmeralda county, owned by Smith Bros., as also like samples from the Pacific works, owned by F. M. Smith. The salines attracted no little attention, and called forth many questions from those unfamiliar with the nature, process of refining and the many industrial uses to which they were adapted. The production of borax is one of the principal industries of the State.

At the closing of the Exposition the Nevada Commissioners turned over the exhibit of that State to the manager of the Union Pacific Railroad exhibit, at Denver, to be kept there as a permanent exhibit, and Commissioner Smith, moreover, agreed to collect additional minerals from the State of Nevada and send to Denver to be added to the Nevada collection already there, thus giving the State of Nevada a permanent exhibit with the Union Pacific railroad at any future exposition.

The collection, as shown by the Commissioners, E. T. George and B. G. Smith, though embracing ores from all parts of the State, was far from being what it might have been had sufficient time been given for a thorough canvass of the State. Many of the most important and promising mines were not represented at all. The entire collection was but the work of a few days, and altogether a private enterprise. The Legislature meeting but once in two years, and the Exposition at Denver not being known at time of its previous meeting, no appropriation was made to meet expenses. But in order that the State might not be entirely without any representation, Messrs. F. W. Dunn, Superintendent of the Nevada Central railroad; A. A. Curtis, banker, and I. A. Blossom, contractor, miner and stock raiser, all of Lander county, and F. M. and B. G. Smith, of Esmeralda county, nobly came to the front and paid the expenses necessary to insure Nevada a representation at the great National Mineral and Industrial Exposition at Denver. Such public spirited citizens are a credit to the State, and the Legislature of Nevada should see to it that the amount is reimbursed to those gentlemen, and a vote of thanks extended for their prompt and noble action in the matter.

There is no need of our describing the amount of work which has been performed on most of the leading mines of Nevada. Our readers are already familiar with that work in all its magnificent proportions. Suffice it at this time to say that several Nevada mines have reached a depth of nearly 3,000 ft., and that the Comstock lode alone has added more than \$350,000,000 to the circulating medium of the world, and that the many promising camps within her borders are still adding to the world's wealth their quota of gold and silver, and many of the useful metals. In the southern portion of the State new discoveries are being opened up and a large industry being built up, not only in mining for the precious metals, but in adding to the world's commerce large quantities of salt, borax, and soda; and notwithstanding the present business depression, we venture to predict that ere long Nevada will once more take her place in the front rank as a bullion producer, and that her mines of other metals and minerals will become the wonder and admiration of the civilized world.

It is to be hoped that the Legislatures of Nevada and other States and Territories will make the necessary appropriation for having a suitable person appointed to visit the different mining districts and obtain collections of ore from all the prominent mines, so that next year a full representation of the mineral wealth of the Pacific States and Territories may be placed on exhibition before Eastern and European capital-

ists. An announcement has already been made that another grand Exposition will be held at Denver next summer under substantially the same management that so successfully planned and carried out that of last summer.

W. B. EWER.

PRODUCTION OF VANADIUM FROM FURNACE SLAG.—It is well known that the cinder of the Thomas Gilchrist process contains very valuable elements, extensive experiments having, for instance, been made to pulverize it and use it as manure. We learn from a paper presented to the French Academy of Sciences by MM. G. Witz and F. Osmand that the authors have succeeded in producing vanadium from Thomas slag. Vanadium, discovered in 1830 by Sefstrom, occurs, besides in a few rare minerals, in many iron ores and other rocks, but in such small quantities that its separation is attended by great difficulties. Vanadium was first used by Lightfoot in 1871 in wood dyeing for changing aniline into aniline black. It possesses the additional property of increasing the luster of the color and the sharpness of the impression in printing on cotton. It is also used for photographic purposes, in painting china, in the manufacture of ink, and in tanning wine. The price of vanadium is at present very high, owing to the difficulty attending its extraction. Vanadate of soda costs from 25¢. to 30¢. per pound. To show the importance of the above discovery to works carrying on the dephosphorizing process, it may be mentioned that in the Crenset steel works alone 60 tons of vanadium might be annually produced.—*Iron.*

IMPROVEMENTS AT THE TANITE CO.'S WORKS.—It is only a few months ago that we chronicled the enlargement of the Tanite works by the addition of several large buildings, which are moreover among the most substantial structures of the kind in the county. But "Tanite" is a synonym for busy activity and energetic progress. It would be unusual for a monthly visitor to fail noting on each return some improvement. The new store house, 24x40, two stories and attic, which became a necessity with the rapidly increasing amount of work turned out, is now thoroughly finished. The company have also just built a new casting shed, 16x30, one story high. They have also just completed the extension of the boiler shed, adding 19 feet to the original one, which is now 50 feet long. They have just put in place a new horizontal boiler, built by Tippet & Wood, of Phillipsburgh, N. J. It is one of 65 horse-power, 15 feet long and five feet in diameter. It has 45 tubes which are four inches in diameter. This boiler is in addition, of course, to one of the same size in present use. They have also just added to their machinery a new Worthington double-acting steam pump, to be used as an auxiliary to the "Nigara" (Campbell & Hardick) pump now in use, both for boiler feeding and for use in case of fire.—*Jeffersonian.*

CALICO DISTRICT.—This comparatively new mining district, in San Bernardino county, is thus hopefully spoken of by the *Colton Semi-Tropic*: Calico has passed through its most discouraging experiences, and is now fairly started on the road to prosperity. The activity in mining operations is constantly increasing. Assessment work is being done on a great many claims; valuable claims are being sold to parties who have the money to develop them; extensive and substantial improvements are being made on the principal mines; good roads are being built which are accessible to all of the best mines; the Oriental mill is rapidly approaching completion; the railroad is completed, depot buildings six miles from town have been erected, and we now have rapid communication with the rest of the world; in town buildings have been enlarged, and preparations are now being made to erect other buildings; stores are increasing their stocks of goods; the travel to this place is increasing; the hotels and lodging houses are doing a good business; and in short, all the various business enterprises in this vicinity are gradually growing in importance, and we may safely predict that before many months the mining operation here will be extensive, and will support a large and flourishing town.

THE EUREKA (NEV.) SENTINEL says a diabolical attempt was made to kill Doc Hamilton the other day in this mine where he is working. He had drilled a hole about 10 inches deep, in which he left the drill. Upon returning to work next morning he found everything as he had left it, and he resumed work, but had only struck a few blows on the drill when a terrific explosion occurred. The drill was hurled from the hole with great force and broken in two, and Hamilton was struck and stunned by the flying fragments of rock. He was, however, not seriously injured, receiving only a cut on the ear and a severe bruise on the leg. Some fiend had inserted a stick of giant powder into the hole, and resploded the drill in order to give Hamilton no intimation of the murderous plot.

An absolute non-conductor of electricity has yet to be found, for all substances hitherto discovered are conductors of the force under certain known conditions; but those which offer a great resistance to it serve the purpose of non-conductors in practice, although they may all be classed as good or bad conductors. The best conductor at present known is silver; the poorest conductor is solid paraffine.

Postal Telegraph.

Why not postal telegraph as well as the old-time mail service? Why should the public enjoy the transmission of news, etc., at a nominal rate by train, and be forced to pay a private corporation a large rate by wire? That is the question, and the answer, in our opinion, is that the working of the telegraph at cost by the Government is just as much a needed contribution to the spread of intelligence to-day as the establishment of cheap mail service was years ago. It seems coming to that gradually. The probability is that we shall soon do much of our business and personal communication by lightning.

The present Postmaster-General is understood to favor the project, and various trade organizations have declared themselves as supporters of the demand for government telegraphy. It is not a new thing. It has been fully tried in England, and we are not therefore undertaking any visionary enterprise in adopting it. The English government bought the private telegraphs in 1869, and has extended them more than four fold since that time. The enormous increase in the value of the service to the public is, however, the chief feature. When the telegraphs were operated by private companies, rates were charged according to distance, and were very much higher than the rate established by the Government, which is one shilling, about 25 cents for 20 words besides date, address and signature to any part of the kingdom. With anything like the same ratio of increase in the use of the telegraph, it is evident that a higher rate would have yielded larger returns, which have inured to the public in this shape of reduced charges. The public was also benefited by the transmission of news, the number of papers served with telegraphic advice being increased from 173, in 1869, to 518, in 1880, the amount of news being largely increased, while the charge for this service was largely decreased. The private companies previously to the acquisition of the lines by government sent out about 6,000 words of news daily, when Parliament was in session, and 4,000 at other times. Under the government, 25,000 words of news per diem are sent when Parliament is in session, and 21,000 at other times.

In the United States our telegraph service, like that of operating railways, has been delegated to corporate organizations, and in the absence of proper supervision and control serious abuses have crept in, and the public has been taxed much higher for the use of these inventions (which it may be said have become necessities of commerce), than is necessary to yield a liberal return upon the capital actually invested. What this is may be indicated by the remarks of President Norvin Green, of the Western Union Company, at the last annual meeting of that company, Sept. 13, 1882:

The same rate of increase for the next five years will produce gross revenues of thirty-one and a half millions and net profits of sixteen millions per annum. But as the growth of the company has been in an increasing ratio—each five years showing a larger percentage of increase than the preceding five years—we may reasonably expect a still greater rate of growth, and, therefore, even larger figures for the year ending in 1887 than those above presented, enormous as they now appear.

It is estimated by good judges that there has never been paid in by stockholders \$16,000,000 since the beginning of the Western Union Company, and that its present property represents simply water and the amounts extorted from the public to extend its lines, besides paying dividends.

This great system, as well as the ocean cables connecting us with the rest of the world, are now virtually controlled by one man, and this individual, whose name has become a synonym for unscrupulousness and rapacity, in common with a few others with similar character, now aim at, and have largely succeeded, in controlling the channels of intelligence, of thought and of commerce, in a nation of 50,000,000 of people.

STILL ANOTHER "NEW USE" FOR ELECTRICITY.—A significant feature of the use of electric lights in agriculture, and one pregnant with great possibilities for the insect-tormented farmer, is the London *Globe* thinks, the wonderful inducement which the light offers to all sorts and conditions of insects to attempt multitudinous suicide by hanging their heads against the crystal globe all through the night and the small hours of the morning. A simple mechanical arrangement, in the shape of a grated trap, into which the impulsive creatures could fall, and whence they could not extricate themselves, would assist them to complete the happy work of self-destruction.

METALLIC GAS.—Some of our contemporaries are apparently making much of the alleged discovery of a Mr. John Dixon, of Liverpool, Eng., of what he calls "metallic gas." His process is merely a bungling way of making gas from petroleum, while he pretends the gas mainly arises from some hidden principle in various metals and minerals which he mixes with it—hence his title, "Metallic Gas." The scheme is merely the reproduction of an old deception practiced by the same party a year or two since in Sydney, where it was thoroughly exploded and shown up as a fraud.

MINUTE MICROSCOPIC MEASUREMENTS.—Mons. Perreux has constructed an apparatus for microscopic measurements which is capable of measuring 1-37,000th part of an inch. The instrument is so delicate that it can only be used at certain hours of the night when the jar of passing vehicles has ceased.

A Novel Way of Making Bullion.

W. P. Nye, well known among mining men as a skilled mechanic, returned last evening from the Plancha de la Plata mine, in Sonora, to which place he had been for the purpose of putting this prospect mill at that place in repair. The mill in question is but of two stamp capacity, although the engine and boiler attached have power for running double that amount. Mr. Nye states that from what he could learn while there the mine has enough ore in sight to run a twenty-stamp mill steadily for two years. The ore is marvellously rich in horn silver. About half a mile above the mill a number of Mexicans are taking out ore and reducing it by arrastras. The ore after being reduced to a pulp is then put into a large vat and boiled for a given time, at the expiration of which it is allowed to settle and the water taken off. The pulp when settled is taken out and the silver separated from it by means of washing it through a large wooden bowl, or, in plain English, "panning it out." While there Mr. Nye saw six and a half pounds of pure silver panned out of a pile of pulp about three feet in diameter and two feet high.

The process in use for the handling of the ore by the Mexicans at the place named is of a most primitive character, hars and shovels only being used in mining. The arrastras, as all mining men well know, are but a collection of large stones so arranged as to form a basin in which the ore is pulverized by the dragging of other stones over them, mules, oxen, horses or donkeys being the power employed for that purpose. The kettles or vats in which the pulp is boiled are made by the building together of strong, quite branches in the form required, and then cementing the sides exposed to the fire with a thick coating of clay. For the panning out process a large wooden bowl known as "the batea" is used. Crude as their means of working may be, the result is said to reimburse them largely for their labor.—*Citizen.*

The Location of Placer Claims.

A gentleman in Montana recently propounded the following questions to the consideration of the General Land Office at Washington:

1. Is an individual claimant limited to one location of twenty acres in a placer mining district?
2. What amount of work is necessary to maintain the possessory title to placer claims?
3. Can work performed or expenditures made in constructing a ditch for the purpose of working a placer claim be applied to the maintenance of possessory titles?
4. Does the law require a greater amount of work per annum to be performed by an association of eight persons to hold possessory title to a placer claim of 160 acres than it does of an individual claimant to maintain possessory title of twenty acres more? The official answer was as follows:

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
WASHINGTON, D. C., Sept. 29, 1882
J. Walbridge, Esq., Bagges, Carbon County,
Montana:

SIR:—Your communication dated the 16th instant has been referred to this office. In reply to the inquiry therein contained, I have to state that the law imposes no limit upon the number of mining claims which a qualified person may locate. Eight persons are allowed to locate in one placer claim 160 acres. The amount of work necessary to maintain the possessory title to placer claims is left by Congress to be regulated by local laws and customs. In Colorado I believe the Legislature prescribes the amount. Whether work performed or expenditures made in constructing a ditch for the purpose of working a placer claim will apply to the maintenance of possessory title, is a matter that depends entirely upon local regulations and customs.

You will understand that a location by eight persons of 160 acres constitutes only one location or claim—not eight.

Respectfully,

M. McFARLAND,
Commissioner.

A NEW CARVING MACHINE.—A Michigan man has invented a new carving and molding machine that takes the palm for rapid work. In its construction the machine is very simple, being composed of a tool attached to a spindle that when thrown into motion springs up through an aperture in the table. The piece of wood to be carved or molded is then pushed against the tool, and the work is done quicker and better than any man could do it. The machine is designed to do all kinds of fancy carving work on cornices, moldings, newels and scrolls.

PAPER IN ARCHITECTURE.—An immense building is to be constructed in Chicago entirely of paper material. It will be six stories high, covering an entire block, and will contain 100,000 ft. of straw-board flooring, 480,000 ft. of straw ceiling, and a large amount of the same material for doors and counters.

A MASTODON GRAVEYARD.—The city of Dallas, Texas, is said to have a graveyard of mastodons, and for five or six years past excavations for buildings have seldom failed to bring up their bones. A large number of these mastodon remains were unearthed recently, and some of the bones were of enormous size.

THE ENGINEER.

THE SUBMARINE TUNNEL BETWEEN ITALY AND SICILY.—From the project presented to the Italian Ministry and proposed to the Venetian Society of Construction by Signor Gabelli, the following particulars are taken: The length of the submarine tunnel between Italy and Sicily will be 41,000 ft. The maximum depth of the sea above the line of tunnel is 365 ft. The thickness of rock between the roof of the tunnel and the bottom of the sea is 115 ft. The direction of the tunnel from St. Agata to Punta del Pizzo is almost due northwest to southwest. The two inclines descending to the tunnel will first run parallel with the shore and then descend to the lowest level by spiral tunnels. The length of these inclines is each 15,000 ft., and the area occupied by each spiral tunnel is 1,160 ft. The degree of inclination will be 35 per 1,000. The center of the tunnel will be on a higher level than the two ends. Walls and subsidiary tunnels will be constructed to drain off the precooling water, and the most difficult part of the line will be first commenced, which will at once show the geological construction of the ground and the difficulties to be overcome. According to the opinions of all geologists the bottom of the Straits of Messina consists of crystalline rock (granite, gneiss and mica schists). Neither in Calabria nor in Sicily can the upper strata that covers this crystalline rock be so thick as to reach the level of the bottom of the descending incline.

IMPORTANT ENGINEERING OPERATIONS.—Parts of Colorado, New Mexico and Arizona, in plats of hundreds of thousands of acres, are level and ready for the farmer, only that there is no water. The rivers running much higher than these valleys or table lands, offer abundant water for irrigation, provided that ditches or channels be cut and dams constructed to divert the water to them. There are numerous enterprises of this kind already in operation upon a moderate scale, and recently an English company has undertaken the cutting of a channel in central Colorado, which will render some 200,000 acres fertile and ready for the farmer's crops. Another stupendous undertaking of a similar kind is on foot by the Colorado Coal and Iron Company. This channel will be opened from a point on the Arkansas river 3½ miles below Canyon City, and be extended across the table-land in a southeasterly direction to the St. Charles river. The ditch will be 30 feet wide and 76 miles long, carrying 5 feet of water. Such enterprises are the feature of the new development of this new country, and are watched with a great deal of interest.

CHANGE IN DE LESSEPS' PLANS.—It is reported that the engineers of the Panama canal have made a radical change in their plan of operations. The intention of the projectors was to make a sea-level canal from one ocean to the other without locks of any kind. Information now comes out that they have found it impossible for any sum of money which could be raised to overcome the natural difficulties of such an undertaking, and they have decided to adopt the ordinary plan—that of locking, up and down the grades. The other scheme involved the operation of digging a canal for some distance through great cuts, which would have been several hundred feet deep, involving an amount of excavation the like of which was never attempted by human hands. There were other difficulties also in connection with that part of the canal where the bed of the Chagres river is utilized which the engineers concluded would form a fatal obstruction to the plan originally entered upon.

CONNECTING THE CHESAPEAKE AND THE DELAWARE.—The *Maritime Register* says: We notice that there is a movement toward carrying out the project of a ship canal between the Delaware and Chesapeake bays. The projectors of this new scheme say that this canal will be pushed to completion without asking for Government aid. This is a very sensible decision on their part. There is no reason why the Government should furnish the money for this work, and if it will give the great advantages to Maryland and Baltimore which have been claimed, Baltimore capitalists ought certainly to be able to build the canal.

RAILROAD IN CENTRAL AFRICA.—A party of 80 Frenchmen, assisted by 1,400 African laborers, are to begin the construction of a railway between the Niger and Senegal rivers. Their operations will be protected by a military column, which will plant the French flag and erect two forts on the Niger.

WORK STILL GOING ON.—It is stated that the works of the submarine railway between Calais and Dover are still going on, notwithstanding political objections, and the gallery is now 445 yards in length. Since the heading has been under the sea there has been, it is said, no leakage. Col. Beaumont's boring machine is being used.

FROM DENVER TO UTAH.—Track on the Utah Extension of the Denver & Rio Grande railway is now laid to Grand Junction, Col., 50 miles westward from the late terminus at Delta, and 425 miles from Denver. The new terminus is only 37 miles from the Utah line.

USEFUL INFORMATION.

SOME FACTS ABOUT BRICKS.—An average day's work for a bricklayer is 1,500 bricks on outside and inside walls; on facings and angles and finishing around wood or stone work not more than half of this number can be laid. To find the number of bricks in a wall, first determine the number of square feet of surface, and then multiply by 7 for a 4-inch wall, by 14 for an 8-inch wall, by 21 for a 12-inch wall and by 28 for a 16-inch wall. For staining bricks red, melt one ounce of glue in one gallon of water; add a piece of alum the size of an egg, then one-half pound of Venetian red, and one pound of Spanish brown. Try the color on the bricks before using, and change to light or dark with the red or brown, using a yellow mineral for buff. For coloring black, heat asphaltum to a fluid state, and moderately heat true surface bricks and dip them. Or make a hot mixture of linseed oil and asphalt; heat the bricks and dip them. Tar and asphalt are also used for the same purpose. It is important that the bricks be sufficiently hot, and be held in the mixture to absorb the color to the depth of one-sixteenth of an inch.—*Railroad Journal*.

EFFECT OF WIND ON DRAFT OF CHIMNEYS.—In a paper bearing the above title, and which was recently read at Southampton, England, by Lord Rayleigh, it was stated that a horizontal wind would usually promote a draft, except in cases where the chimney opened out upon a large expanse of wall, and so was indirectly affected, in which case there was only one cure, namely, to carry the chimney higher. When the wind was inclined downward to the chimney at an angle of 30° and more, there was a down draft, and the maximum up draft was produced by wind inclined upward at about the same angle. The simplest thing to prevent wind blowing down a chimney was to erect a T-piece on the top. In that case a vertical or inclined wind favored the draft, and the effect of a wind blowing through the T tube was practically nothing. Lord Rayleigh, moreover, contended that chimneys should be turned upside down; that is, the opening at the fireplace should be narrow and the outlet wide; and that if all the chimneys in a house could be made to open into a common cloaca, a down draft would hardly ever occur.

A FOUNDRY FLOODED WITH SULPHUR.—A singular and remarkable occurrence recently took place in the large foundry of the Reading, Pa., Hardware Company, where 90 men are employed. The atmosphere on the outside was dense and all the windows were tightly closed. Suddenly a large amount of sulphur and gas was driven out of the opening in the cupola among the men, scattering all over the foundry. Ten became deathly sick and dropped to the floor at once. The others commenced vomiting and complained of severe pains in the stomach and head. Two were perfectly unconscious and remained in that condition for some time, having to be taken to their homes in carriages. The foundry presented the appearance of a huge hospital, with men lying in every direction. About 70 men were affected.—*Ex.*

THE PROTECTIVE QUESTION.—A great deal of needless misunderstanding is occasioned in protection-free-trade discussions by not understanding terms and phrase. A high tariff is not necessarily a protective tariff, nor a low one for revenue. Protection is an end to which a tariff is the means, and this end may be secured, sometimes by a high tariff, sometimes by a low tariff, sometimes by no tariff at all. An exceedingly high tariff may not be obstructive after it has ceased to be protective. The duty on horse-shoe nails, for example, is very high and practically inoperative, but it is in no sense obstructive. A high tariff, when inoperative, is also obstructive only when it prevents competition and makes monopoly possible.—*Boston Com. Bul.*

POTENCY OF THE HUMAN VOICE IN CONTROLLING THE HORSE.—The reins may guide the horse, the bit may inspire him by its careful manipulation, and the whip may urge him forward to greater ambition; but the human voice is more potent than all these agencies. Its assuring tones will more quickly dispel his fright; its severe reproaches will more effectually check his insubordination; its sharp, clear, electric commands will more thoroughly arouse his ambition, and its gentle, kindly praises will more completely encourage the intelligent road horse than the united forces of the bit and reins and the lash. No animal in domestic use more readily responds to the power of kindness than the road horse.—*National Live Stock Journal*.

HOW TO TELL A GOOD MILLSTONE.—An old Hungarian miller is reported to have given this rule for telling a good millstone: "When about to select a stone take a flask of gin and pour a little of it upon the stone; if the stone absorbs the liquor so that the surface appears dry, it is a good one, but if the gin remains on the surface the stone is good for nothing."

THE MINT IN SAN FRANCISCO is the largest in the world—twice as large as the one in Philadelphia, and three times the size of any in Europe, having \$24,000,000 worth of coin and bullion stored away in its vaults.

PROGRESS OF MANUFACTURING INDUSTRY.—The progress of manufacturing industries in the United States has been such that an arbitrary division into manufacturing and agricultural sections can no longer be maintained. In seven principal Western States—Ohio, Indiana, Illinois, Missouri, Iowa, Wisconsin and Minnesota—the manufacturing industries were less than one-half those of the New England States in 1850. Now these industries in the Western States named exceed those of the New England States. More than 10 years ago the annual aggregate value of manufactured products exceeded the value of all agricultural products in the above Western States. The number of patents now annually taken out in the North-western States far exceeds the number issued to citizens of the New England States.

THE SPRING STREET CAR MOTOR.—It is reported that recent experiments in Philadelphia have proved that it is possible to propel street cars smoothly and rapidly by the expansion of powerful steel springs, the difficulty of giving a uniform and perfect temper to the metal having been overcome. The company controlling the patents makes the following claim: The motor consists of six springs coiled upon a cylinder. Each spring will be made of a flat bar of steel 300 ft. long, 6 inches wide, and one-fourth inch thick. These springs are tempered by the new process so uniformly and delicately that their power becomes tremendous. After first being coiled so that their diameter is 18 ft., they are tempered, and then wound up until the diameter is 7½ ft. In this condition they are placed upon the motor truck and the appliance of the patents adjusted.

SUBWAYS FOR GAS AND WATER PIPES.—The *New York World* suggests the advisability of constructing under the streets of that city what it calls subways, through which working men can travel, as a means of avoiding the tearing up of streets for the repair of water, steam and gas pipes. This is by no means an infeasible scheme, since it has long been in operation in Paris, and for a city so troubled with travel and traffic as New York there are few greater nuisances than an uproot street. In time this difficulty will come to perplex us, after we have solved our bridge problem.

THE ERIE CANAL was formally opened in 1825; it then carried a boat through with 90 barrels of flour; now 900 barrels are the regular cargo.

GOOD HEALTH.

The Digestibility of Oysters.

Why oysters should be eaten raw is explained by Dr. William Roberts in his lecture on "Digestion." He says that the general practice of eating the oysters raw is evidence that the popular judgment upon matters of diet is usually trustworthy. The fawn-colored mass, which is the delicious portion of the fish, is its liver, and is simply a mass of glycogen. Associated with the glycogen, but withheld from actual contact with it during life, is its appropriate digestive ferment—the hepatic diastase. The mere crushing of the oyster between the teeth brings these two bodies together, and then the glycogen is at once digested without any other help than the diastase. The raw or merely warmed oyster is self-digestive. But the advantage of this provision is wholly lost by cooking, for the heat immediately destroys the associated ferment, and a cooked oyster has to be digested, like any other food, by the eater's own digestive powers.

"My dear sir, do you want to ruin your digestion?" asked Prof. Houghton, of Trinity college, one day, of a friend who had ordered brandy and water with his oysters in a Dublin restaurant.

Then he sent for a glass of brandy and a glass of Guinness' XX, and put an oyster in each. In a very short time there lay in the bottom of the glass of brandy a tough, leathery substance resembling the finger of a kid glove, while in the porter there was hardly a trace of the oyster to be found.

CITY SEWERAGE.—In answer to a question recently, when before a committee of the City Council of Philadelphia, Col. Waring said, with reference to the ventilation of sewers: "I would use neither street openings nor tubes. Each householder should be required to run the drain pipe which carries the sewage from his house up to the roof. It should be left untrapped, and then every discharge of sewage all through the city would be followed by a draft of fresh air. With such sewers as yours the impregnation of the soil by noxious gases is much to be feared. It would cost little more to make them fit to do the duty for which they are designed. They should be gasketed inside and out, the joints tightly closed and the material of the heat, and they should be kept clean. But defective house drainage exerts influences as harmful as do the most wretched sewers. The greater number of the cases which doctors attribute to sewer gas is due to fault, not in the sewers themselves, but to the filthy pipes which carry off the house drainage. Illuminating gas very often escapes from the pipes into the sewers, and most of the explosions are apparently due to that cause."

Salicylic Acid in Typhoid Fever.

A member of the French Academy of Medicine, at Paris, M. Vulpian, at a recent meeting of the Association asked if the terrible scourge of typhoid fever might not be more successfully treated by the employment of some soluble antiseptic, susceptible of finding its way, without alteration, into the intestines, and then neutralizing the typhoid virus. Trial in that direction had been made with various antiseptics, but salicylate of soda seemed to have been attended with the best results.

M. Vulpian, recalling the fact that typhoid fever, the same as the small-pox, the measles and scarlet fever, consists in reality of an intoxication caused by the virus absorbed, and which, on its first attack, we seek to combat in the blood itself and in its organic elements, remarked that the medicine ought to reach not only the microbes but the nervous centers, which impel the general circulation.

To effect this, his choice is salicylic acid, to which numerous German, Italian and American works have for a long time accorded an action certain and preponderant.

The dose of salicylic acid—given in unbleached bread—is about half a gramme every half hour or hour, but it has been increased successfully to 6, 10, and 12 grammes—one gramme is equal to 23 grains. It is the medium dose of 6 to 7 grammes per day which should form the base of the new medication.

From a careful study of various cases at the Hotel Dieu, it is found that but little inconvenience is experienced in administering salicylic acid; while on the other side, the beneficial effects of salicylic acid have always been very striking, as follows:

The regular and permanent lowering of the temperature from 40.5°, to 39°, 38.5°, at the end of 24 hours. Amelioration of the general condition of the patient.

The action of this medicine is, then, logical, though it may not be all-powerful and veritably curative. Salicylic acid, given in sufficient doses, is, up to this time, one of the most powerful agents in moderating typhoid fever.

This point established, M. Vulpian demanded, "if salicylic acid could not be employed as a prophylactic and preventive agent in epidemics of typhoid fever, and if taking daily a moderate dose of the medicine would not have the effect of annihilating the action of the typhoid poison?"

THE ASHES OF THE DEAD.—A correspondent of *Knowledge* (London), who signs himself "A Brother Cinder," referring to the first two cremations which have taken place in England in modern times and to the disposition which was made of the ashes, begs leave to suggest "a far neater and more appropriate mode of disposing of the ashes of a corpse cremated. These ashes, I think," he observes, "consist wholly or principally of phosphate of lime, and therefore have only to be treated with sulphuric acid to convert them into sulphate of lime—i. e., gypsum of plaster of Paris. With this substance a model can be cast in a mould previously prepared, and representing either the full figure of the deceased or simply the bust, or the likeness can take the form of a medallion. Whichever form of memorial is adopted a glass case would be sufficient protection for it, and the costly urn can be dispensed with as unnecessary, while the remains of our loved ones will themselves be gathered into the form of a compact and lifelike memorial, which itself will be composed of the veritable 'ashes of the dead.'" It is doubtful whether in this country, for years to come, if ever, the idea of incineration or cremation can be popularized. There is a repugnance to it in the general mind which cannot easily be overcome. In France the subject is in a manner forced upon the public. The crowded condition of the cemeteries necessitates the removal of bodies long distances from the city—as much as 30 miles—the expense of which, when the poor are interred, falls upon the municipality. In consequence a bill is before the Assembly to legalize cremation. In England also this question of cremation is being seriously considered. The same argument applies to London as to Paris in reference to disposing of the remains of the dead. England will be slower to accept the alternative than France, but it would not be surprising if both countries would ultimately adopt it, as the least of evils presenting themselves in connection with sepulture.

POWER OF THE WILL.—We hear frequently of pretenders who profess to heal diseases by "laying on of hands," etc. The real manner of healing in all such cases is merely the determined exercise of the will power, or what is the same thing, faith in the healer and his art. Witness the following evidence of the power of the will in such cases: A lady was sick from apparent exhaustion, and for a long time had kept her bed. Her pastor, at her request, had prayed and prayed, but she was no better. A new physician one day called. He came to her bedside and said: "I think that the best thing you can do is to get up!" And she got up. "Go down stairs!" And she went down. The next day she was on the street, enjoying a walk after a long, long confinement. "I didn't cure her," said the physician, "for there was nothing to cure. She had lain in her bed so long that her will power had all gone." His prompt and heroic treatment startled into life her paralyzed resolution.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, Jan. 6, 1883.

TABLE OF CONTENTS.

EDITORIALS—Dry Crushing and Roasting Mill; A New Amalgamator and Concentrator; 1. Passing Events; Magnetic Separation of Ore; Classification of Mineral Lands; Academy of Sciences; California State Geological Society; B. State Mining Bureau; Winter in California; A. New Fire Extinguisher; Patents and Inventions; Notices of Recent Patents; 12.
ILLUSTRATIONS—General Arrangement of a Dry Crushing and Roasting Mill; 1. Hotel Del Monte at Monterey, Cal.—View of the West Side; Scene in the Grounds of the Hotel Del Monte; 9.
CORRESPONDENCE—Notes from Eureka, Nevada; 2.
MECHANICAL PROGRESS—Asphalt Foundations for Machinery; Steel vs. Iron Rails; American vs. English Nailmakers; Tempering Steel; Improvement in Tempering Glass; Improvement in Watch Hairs; Posts and Girders; 3.
SCIENTIFIC PROGRESS—Parasites in a Fly's Tongue; Migration of Fish Through the Suez Canal; Recent Finds in the Connecticut Valley Sandstones; Discovery of the Carbon Volts; Arc; Sun Spots; Another Great Lake in Africa; Electro-Generative Fuel; Transfers of the Earth; 8.
MINING STOCK MARKET—Sales at the San Francisco Stock Board; Notices of Assessments, Meetings and Dividends; 4-5.
MINING SUMMARY from the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana and New Mexico; 4-5.
THE ENGINEER—The Submarine Tunnel between Italy and Sicily; Important Engineering Operations; Change in De Lesseps' Plans; Connecting the Chesapeake and the Delaware; Railroad in Central Africa; Work Still Going on; From Denver to Utah; 7.
USEFUL INFORMATION—Some Facts about Bricks; Effect of Wind on Draft of Chimneys; A Foundry Flooded with Sulphur; The Protective Question; Agency of the Human Voice in Controlling the Horse; How to Tell a Good Millstone; Progress of Manufacturing Industry; The Spring Street Car Motor; Subways for Gas and Water Pipes; 7.
GOOD HEALTH—The Digestibility of Oysters; City Sewerage; Salicylic Acid in Typhoid Fever; The Ashes of the Dead; Power of the Will; 7.

Business Announcements.

Sewer Gas Trap—Garland Mfg Co., Oakland, Cal.
 Dividend Notice—San Francisco Savings Union, S. F.
 Dividend Notice—Bulwer Con. M. Co., S. F.
 Dividend Notice—Navajo M. Co., S. F.
 Dividend Notice—Stannard Con. M. Co., S. F.

Passing Events.

We begin with this number Volume XLVI of the MINING AND SCIENTIFIC PRESS under encouraging auspices, the paper now having a large and increasing circulation and liberal advertising patronage. We intend to make this volume exceed its predecessors, and more particularly in respect to the illustrations, which will be more numerous than formerly. The PRESS will be improved in every way, and our patrons may rest assured their interests will be closely looked to.

News from the mines is somewhat meager just at present, the weather of late somewhat interfering with operations.

The most notable local event of late has been the unprecedented fall of snow in San Francisco, Oakland and many other towns in this State on December 31st. Never since the State has been an American one has a similar storm occurred in the coast regions. The snow-fall was four to six inches deep, and thousands of persons saw snow for the first time.

There came near being a bad fire in the Sutro tunnel on New Year's day. It took about three hours to drive the smoke back, the fire being at a point 300 ft. north of the C. and C. shaft, but when the fire was finally reached it was quickly extinguished. It burned about 13 sets of timbers and the drain boxes that ran along the side of the drift. No great damage was done.

Magnetic Separation of Ore.

Some time since we illustrated and described the apparatus invented by Mr. Edison for the magnetic separation of ore. A man named Hans J. Muller, of New York, has now invented one of an improved form. The new machine consists of a revolving cylindrical electro-magnet, around which a band or belt passes, also passing around a cylinder or roller parallel with the magnetic cylinder in combination with a vibrating feeding device, from which the granulated or pulverized material drops tangentially to the magnetic cylinder, so that the particles of steel or iron will be attracted by the magnetic cylinder and will be carried off by the belt until the same leaves the magnetic cylinder, when these particles of iron or steel will drop into a suitable chute or receptacle separated from the box or chute into which the ore drops by a beveled longitudinal partition.

A magnetic plate extends longitudinally along the magnetic cylinder, below the same, and over the chute into which the particles of iron drop, for the purpose of preventing the swinging clusters or particles of iron or steel which are formed on the belt from dropping into the chute or receptacle from the ore. The invention also consists in so constructing the magnetic cylinder that it has double poles—that is to say, two opposing poles in the middle of its length, beside those at the ends.

For very finely divided particles the belt is made of thin sheet brass, but for coarser particles it is made of steel or iron sheets.

The operation of the machine is as follows: The pulverized ore from which the particles of iron or steel are to be separated is placed in a hopper, and the cylinder is rotated. By suitable mechanism a shelf is vibrated on a horizontal plane, and the non-metallic portion of the pulverized ore, or rather the portion which has only slight capacity for magnetic attraction, will drop from the inner edge of the shelf through a slot. As the material passes the cylinder the particles of iron and steel will be attracted by the magnetic cylinder and will cling to the belt and be carried around by the same until it leaves the cylinder, which takes place directly above another slot, when the particles of iron or steel will drop into or through a slot into a receptacle. The ore leaves the belt at this point because the magnetic attraction there becomes insufficient to hold it—to support its weight.

In case the pulverized ore contains very large quantities of iron or steel, long clusters or particles of iron or steel will be formed at the lower part of the cylinder, and as these clusters receive a swinging motion from the movements of the belt, they drop sometimes, but arrangements are made to catch them.

Classification of Mineral Lands.

The method of classification of mineral lands on the public domain when the lines of the survey are being extended over them is as follows: At the time of survey in the field the deputy Surveyor notes on his field notes (which remain permanently in the Surveyor-General's Office, a copy being sent to the Commissioner of the General Land Office) the character of the country, both from observation and information from persons, if any there be having knowledge of the same. This makes up the general topography. He describes the country by sections one mile square. When the deputy makes up his plats he enters upon them the topography noted in his field notes and returns the same to the Surveyor-General, who prepares three copies thereof. One of the township plats, with a copy of the field notes, is sent to the General Land Office to be used in checking all entries or changes of entries made in the district land office. If the land surveyed is returned as mineral, the Commissioner at once issues notice to the land office of the district in which the lands lie of the withdrawal of the same from agricultural or entry other than as mineral. Claimants of mining claims may make application for survey to the surveyor-general, as provided by law, and the survey of their claims will be made by a mineral deputy, with or without reference to the lines of the rectangular system. Still they can and may be used for points of determination and reference. Proof is admissible upon contest in the district land offices between claimants as to its mineral or non-mineral character. The Register and Receiver render an opinion on the case, which is forwarded to and approved or disapproved by the Commissioner of the General Land Office, and after his action is subject to appeal to the Secretary of the Interior. In case the rectangular surveys are not extended over the lands containing mineral, the claimant, whether a mining district has been formed by the miners or not, applies to the Surveyor-General, who orders a survey by a deputy mineral surveyor whether public land surveys have been made or not. The survey of a mining claim—lode, vein or placer—has no reference necessarily to any other surveys or systems of surveys.

Academy of Sciences.

Annual Meeting and Election.

The annual meeting of the California Academy of Sciences was held on Monday evening last, President Davidson in the chair. The report of the election held during the day was read and showed the following result: President, George Davidson; First Vice-President, Justin P. Moore; Second Vice-President, H. Herman Behr; Corresponding Secretary, Samuel B. Christy; Recording Secretary, Charles G. Yale; Treasurer, Elisha Brooks; Librarian, Carlos Troyer; Director of Museum, W. G. W. Harford; Trustees—George E. Gray, Ralph C. Harrison, James M. McDonald, Robert W. Simpson, Thos. P. Madden, Charles F. Crocker, Lewis Gerstle.

Financial Condition.

The Board of Trustees of the Academy submitted a report showing the financial status of the Society: The total amount of receipts for the year from all sources has been \$28,445.14; total expenses, \$25,707.04, leaving a balance cash on hand of \$2,829.17. In April the Trustees purchased from Professor Henry A. Ward a valuable collection of natural history, paleontology and geology, for \$16,000, and placed it in charge of the Director of the Museum to be opened for public exhibition at Mercantile Library Hall, which was hired for the purpose. Messrs. Charles Crocker and ex-Governor Leland Stanford donated \$8,000 each to enable the Academy to effect this purchase, and the joint gift is now named the "Crocker-Stanford Collection." The amount collected for dues and memberships from life and resident members during the year was \$3,257.50; outstanding monthly dues, considered collectable, \$998.50; rents yielded \$1,118.44, while payments of all kinds aggregated \$2,333.75. The property of the Academy consists of the library and museum, with its fixtures and furniture, bookcases, desks, safe, specimens of mammals and birds and the Crocker-Stanford collection.

The real estate owned by the Academy is described as follows: Market street, lot lying on the southeast line of Market, 195 ft. southwest from Fourth, thence southwest 80 ft., thence southeast 275 ft., thence north 113 ft., thence northwest, 195 ft. to point of beginning (the gift of the late James Lick during his lifetime). The title is now perfect. City lot between Geary and Post streets, 187 1/2 x 240 ft., corner of First avenue and Meade street. Other permanent property to the value of \$274.80 was also acquired by purchase during the year. There is in process of settlement a half interest as residuary legatee in the unsettled estate of James Lick, likely to be realized by the close of the year 1885. In August Mrs. E. B. Crocker, of Sacramento, donated a rare and valuable collection of over 1,000 birds and 100 mammals in glass cases, valued at \$12,000. Patrons of science have donated gifts to the amount of \$32,058.50.

A valuable paleontological collection, purchased by Irving M. Scott, Wm. B. Hyde, Jas. O'B. Gann, Christian Froelich, Jr., R. H. Pease, Jr., Andrew Carrigan, P. N. Lilienthal, J. B. Randol and A. Chahot, has been donated to the Academy, and is now on exhibition at Mercantile Library Hall. This was purchased from C. D. Voy, and is known as the Voy collection. The Trustees have in charge as a special trust the "Crocker Scientific Investigation Fund," which consists of 20 registered bonds of the Southern Pacific railroad for \$1,000 each, and the income is being regularly expended in assisting worthy investigators in accordance with the terms prescribed in the letter of Charles Crocker, the generous donor of the fund. Henry M. Newhall, a late fellow member, generously, as a donation, advanced the sum of \$300 from the rent of the building. The executors of the estate have reduced the rent to \$150 monthly. During the year the Board of Trustees held 34 meetings. A special committee, appointed to consider the propriety of removing the museum of the Academy to some more suitable locality, failed to find a desirable building in a proper neighborhood. The sum of \$3,430 was collected from 25 subscribers to provide a fund necessary to maintain the free exhibition of the Crocker-Stanford collection at Mercantile Library hall.

Officers' Reports.

The report of the Recording Secretary, Chas. G. Yale, showed that there had been elected during the year 40 resident members and 23 life members; deducting resignations, dropped for non-payment of dues and four life members who died, there was a net gain during the year of 47 members. There are now 118 life members and 188 resident members, or 306 in all. Twenty-five meetings of the Academy were held during the year, 24 being regular and one special. The average attendance at meetings during the year has been 51.

The report of Elisha Brooks, Treasurer, showed the following items: Receipts, gifts, etc., \$19,758.30; interest of Crocker's Scientific Investigation Fund, \$1,200; from rents, \$4,118.44; from life memberships, \$1,800; dues from resident members, \$1,457.50; sundries, admission to museum, etc., \$1,070; balance on hand January 3, 1882, \$91.07. Total receipts, \$28,536.21. Disbursements—Maintenance Fund, \$17,876.47; Crocker's Scientific Investigation Fund, including allowances made, \$720; expenses investigating the Carson footprints,

\$103.15, \$823.15; General Fund, rent of halls, and all other expenses, \$7,007.42. Total, \$25,787.04, leaving a balance in bank of \$2,829.17.

The report of the Librarian, Carlos Troyer, shows 843 volumes of valuable works received, besides the usual exchanges. All authors issuing pamphlets on subjects of interest throughout the Pacific coast are requested to donate a copy for preservation in the Academy's library.

Mr. Haaford, Director of the Museum, gave an ennnary of the donations to the museum for the year.

Honors to Members.

The Council of the Academy, acting under the privilege allowed it of nominating for life membership two members annually, presented the name of Gustaf Eisen, a young man who has done of late some very valuable scientific work in the investigation of "Earth Worms." He has contributed many botanical specimens to the Academy, and as a natural history student stands in the front rank. The Council's recommendation was adopted, and Mr. Eisen was unanimously elected.

Vice-President J. P. Moore stated that one of our oldest and most valuable members was about to leave us to pursue scientific work at the Smithsonian Institution, in Washington, and he thought that the Academy should take some suitable action in expressing its appreciation of his services and labors while with us and wish him Godspeed on his journey. He alluded to Dr. Robert E. C. Stearns, who was well known to all the members as one of our earnest workers and most intelligent co-laborers. Professor Davidson, the President, heartily coincided with the views expressed by Mr. Moore. He said the scientific work done by Mr. Stearns in his specialty was recognized as of the highest value. He had been one who had always kept in view the highest interests of the Academy, and had been identified with it for many years. The Board of Regents of the University of California, a very conservative body, had on his resignation of his long held position of Secretary of the Board, conferred on him the degree of Ph. D., an honor of which they are very chary. The President thought a committee should be appointed to draft suitable resolutions expressive of the regret of the Academy at Dr. Stearns' departure. A motion to that effect having been made, J. P. Moore, H. W. Harkness and Dr. A. Kellogg were appointed.

Mr. Moore spoke of the valuable botanical and arboral work done by Dr. Albert Kellogg, under the patronage of the "Crocker-Stanford Scientific Investigation Fund," which he characterized as unsurpassed for beauty of execution and thoroughness of detail. Dr. H. W. Harkness has labored constantly at his work on Fungi, assisted by Mrs. Dr. Curran. This new department of Fungology, now being paid so close attention to, was very important, and the labors of Dr. Harkness were of the greatest degree of value.

Transit of Venus.

Prof. Davidson asked for one month's further time to prepare his report, as his time had been fully occupied since his return from observing the transit of Venus. He then gave a rapid sketch of his astronomical observations and the mechanical details of the transit party, with free-hand blackboard illustrations. The Professor described the peculiarities of the transit in detail, and gave a very interesting lecture. He said his party were favored with exceedingly clear and fine weather, and the contacts were sharp and clear, no "black drop" or wavy outline being apparent. He spoke of the peculiar halo, or light, on part of the planet. He said two new observers, not professionals, Mr. J. P. Moore, at Mt. Diablo, and Mr. Burkhalter, in Oakland, had observed a flash of light on the planet when it left the sun, not noticed by any other observers. Mr. J. P. Moore described the transit as seen by him from Mt. Diablo.

California State Geological Society.

The sixth annual meeting of the California State Geological Society was held Thursday, Dec. 28th, at the rooms of the State Mining Bureau.

The President read his annual address, which we have put in type, and will publish in full in next week's PRESS.

Henry Janin, M. E., Louis Janin, M. E., Hon. John Daggett, John D. Coughlin, D. W. C. Morgan, L. Wagoner, M. E., Jas. H. Croseman, Hon. Jos. Wagoner, Chas. G. Yale, W. B. Ewer and J. R. Scupham were elected regular members, and Dr. Joseph Szabo, of Budapest, Hungary, was elected a corresponding member. A paper by James H. Croseman, describing Santa Fe mining district, Emeralds, Nev., was read by the Secretary.

The election of officers for the ensuing year resulted as follows: President, Henry G. Henke; Vice-President, Melville Attwood; Secretary, S. Heydenfeldt, Jr.

IMPORTANT TO MINERS.—The Supreme Court of this State has recently rendered a decision to the effect that the law of Congress requiring an annual expenditure of \$100 on unpatented mining claims apply to gravel and placer claims as well as quartz. It has usually been considered that the law was intended for quartz claims only, but owners of all kinds of unpatented mining ground have now a warning that it is important that they shall heed, and if the requisite amount of work has not been done within the past year, they should be prompt in commencing the labor now at the opening of the new year.

The State Mining Bureau.

Report of the State Mineralogist.

The report of State Mineralogist Hanks has been laid on our table this week, and while no very careful review is possible, we find much of interest. The report fills 288 pages, with an appendix of 266 pages, and there is also a catalogue of 349 pages, showing the specimens given to the Bureau during the year ending April 16, 1881. The report itself covers a period of two years. The following figures will show the growth of the institution:

Receipts from Dec. 1, 1880, to Sept. 1, 1882, total, \$15,432 46. Total warrants issued from Dec., 1880, to June 1, 1882, \$20,888 65. Complete tabulated statements of all transactions are embodied in the report. In addition to a fine collection to start with (all of the State Geological Society's accumulation), there have been added between Dec., 1880, and Sept. 1, 1882, 723 books and pamphlets, 66 maps, charts and pictures and 2,124 specimens of minerals, as follows:

Donated—Books and pamphlets, 682; maps, charts, etc., 39; minerals, etc., 1,904; total, 2,565.

Purchased—Books, 102; maps, etc., 27; minerals, etc., 220; total, 349; grand total, 2,914.

This, added to the previous collection, which consisted of—books and pamphlets, 433; maps, charts, etc., 61; minerals, etc., 2,023; total, 2,517, presents a grand total of 5,431 catalogued and prepared for exhibition. There is still a large number of mineral and other specimens not yet catalogued, of which no record is made. Mr. Perkins, the Secretary, adds the following interesting information on an important feature of the Bureau: Since the date of the last report 1,090 letters have been written to 1,023 correspondents, as follows: Communications and replies on sundry subjects, 563; acknowledgments, 195; information on minerals, 151; information, various, 175; total, 1,090. During the same period there were received 900 letters from 659 correspondents, as follows: Sundry subjects, 186; acknowledgments, 91; inquiry on minerals, 96; inquiry, various, 206; donations, 98; information, 223; total, 900.

The principal paper in the report is on Placer, Hydraulic and Drift Mining, by the State Mineralogist. He also has a paper on Ores and Iron Industries of California. There is also a chapter on "Lumber and Fuel," one on "Salt in California," one on "Mud Volcanoes in the Colorado Desert," on "Diamonds in California," "Notes on Mica," "Notes on Roscoelite," "Diatoms and Diatomaceous Earth." There is also a glossary of mining terms, compiled by Dr. De Groot. There is also in the chapter on hydraulic mining some copious notes on gold, and tables of yield of California gold mines.

The appendix contains several papers supplementary to the Report of the State Mineralogist. The most exhaustive is on "The Forest Trees of California," by Dr. Albert Kelllogg. We have published a number of descriptions from this part of the report, which formed part of a separate publication printed some time since. "Notes on Hydraulic Mining" is a paper by F. W. Robinson. "Hydraulic and Drift Mining" is by Dr. Henry De Groot. "On the Milling of Gold Quartz" is by Melville Allmar.

"Rare Minerals Recently Found in the State" is by Wm. P. Blake. "Fluoride" is by Almarin B. Paul.

The following remarks by the State Mineralogist show the growth of the museum: "A catalogue of the first year's collections, amounting to 3,000 in number, has been prepared and is ready for distribution. The number of specimens entered and ready for the museum is now 4,147, and there are at least 2,000 more not so entered, but in process of classification. The museum is growing more rapidly than is generally known or could be expected; specimens are flowing in from every part of the State, and also from other States and Territories of the Pacific

coast. Besides these, many valuable specimens have been obtained in exchange with other States of the United States with foreign countries.

"Duplicate Specimens.—In making the collections many duplicates have been collected. To these have been given the same numbers received by the specimens in the museum cases. It is the intention of the management to place these duplicates in suitable drawers in which they will be accessible, and to make up sets for

it is also true that, with a few trifling exceptions, no money has been expended beyond furnishing cases and paying necessary freight; nor in any way has the legitimate working of the Mining Bureau been interfered with by this cause. The popularity of the institution has stimulated the generosity of citizens, and the State Museum has been greatly enriched by these donations. The policy of the State Mining Bureau was set forth in circulars issued and published in the first report of the State

Winter at the Seaside in California.

It is only upon the Pacific coast that seaside scenes are a delightful year round. Winter on the Atlantic coast is most dreary, and the various resort hotels stand deserted upon lonely wastes. It is quite different in California, for winter at the seaside is even more delightful than summer. The greater part of the time the sunshine is warm, the air clear, the fields and gardens full of beauty and fragrance, and the whole scene is in perfect contrast with the "winter" as it is known in all other parts of the country.

There are several seaside places which are truly entitled to distinction as winter resorts, but the most prominent just now is Monterey, with its splendid hotel and its handsome grove and well-kept gardens. Our engravings give glimpses at some of the charms at Monterey. One of the pictures is a view of the Hotel del Monte, which was built in 1880, and is without question the handsomest watering place hotel in America. The site selected was in a lovely grove of pine, oak and cedar, the trees being sufficiently scattered to admit of the adornment of the grounds by means of drive-ways, foot-paths, lawns and beds of flowers. A plot of 126 acres was enclosed and set aside as the hotel grounds, while 7,000 acres more were purchased for other purposes. The fact that the visitor may ride a score of miles over well-kept macadamized roads, and be nearly all the time within the borders of the hotel company's property, serves to show in some measure the vast extent of these possessions.

The Hotel del Monte is constructed in the modern gothic style, and cost, with its furniture and other appointments, a quarter of a million of dollars. No seaside hotel upon the Atlantic coast can approach its plan of exterior, while its interior design and finish display the same refined taste and lavish use of wealth.

Another engraving gives a scene in the park surrounding the Hotel del Monte. The picture is from a photograph taken by Watkins, in January, 1882, and thus gives the grounds in their true winter condition. The evergreen oaks, the fresh grass, the blooming plants in the borders show how gentle is the air and warm the winter's sun. In its beautiful embellishment of foliage and flowers, the Hotel del Monte resembles some rich private home in the midst of a broad park. This impression is heightened when the broader extent of avenues, lawns and flower-bordered walks come into view. The gardener's art has turned many acres into a choice conservatory, where the richest flowers blossom in profusion. Here and there are swings, croquet plat, an archery, lawn-tennis grounds and bins of fine beach sand, the latter being intended for the use and delectation of the children who cannot await the bathing hour for the daily visit to the beach. In all directions there are seats for loungers, and the situation and arrangements are in every way delightful.

GOLD COIN MADE HERE. Coinage operations at the Mint in this city for the year 1882 were confined to gold coin and standard dollars, as follows: Double eagles, \$24,175 000; eagles, \$2,820 000; half eagles, \$1,670 000; standard dollar, \$9,250 000; total, \$37,915 000. The largest amount of coinage for the year was in August, when \$6,130,000 was made, including \$5,180,000 in double eagles and \$950,000 in standard dollar. The amount of standard dollars coined last year is \$3,510,000 less than in 1881. This decrease is due to the inability to procure fine silver for the Mint here on as favorable terms as at the other Mints. The total coinage for 1881 was \$11,845,000, and for 1880 it was \$37,427,000. There was comparatively little small gold coined last year. In 1881 there was \$9,700,000 in eagles and \$4,845,000 in half eagles.

JUDGE SAWYER is visiting the slickens district in Yuba county.



HOTEL DEL MONTE, AT MONTEREY, CAL.—VIEW OF THE WEST SIDE.

the use of the public schools, and to be used in exchanges. Application has already been made by the State Normal Schools, and, as soon as possible, selections will be set aside from the duplicates for these institutions. Application was also made by the dental department of the State University for a set of minerals to illustrate hardness of minerals, which was furnished as requested.

"The establishment of the State Mining Bureau has developed, or rather made manifest, the

Mineralogist, from which no deviation has been made, except when forced by the diminishing Mining Bureau fund."

As we have said, it has been impossible in the limited time to go into any extended review of the report; but it appears a creditable document, and one that will be of interest to the mining community for whom it was written. It is to be hoped that it will be circulated in this State, which pays for it, and not be too freely scattered elsewhere, as seems to be the



SCENE IN THE GROUNDS OF THE HOTEL DEL MONTE, FROM A PHOTOGRAPH IN JANUARY.

want of a first-class chemical and metallurgical laboratory, in which analysis of ores, minerals, mineral waters, rocks, building stones and other mineral deposits of the State should be made, and the results published for the benefit of the people of the State directly and the world at large indirectly.

With regard to the nature of the collection Mr. Hanks says: "It has been intimated that the Mining Bureau has paid undue attention to the collection of curiosities and specimens of natural history, and, in doing so, has overstepped the intention of the Mining Bureau hall. While it is true that many valuable donations of this character have been received,

fate with U. S. Mining Commissioners' and Mint Directors' reports, few of which reach the people for whom they are intended. Our legislators, when they get these reports, should look to it that representative miners in their localities obtain them.

The Old South Church of Boston has called Rev. George A. Gordon, of Greenwich, Conn., at a salary of \$8,000 and the parsonage.

LEAD in Liverpool is quoted at £14 to £14 24. 61. for English, and £13 15s. per ton for Spanish, with and without silver.

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MANUFACTURERS OF IMPROVED AND APPROVED FORMS OF

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For working gold and silver ores by wet or dry crushing. The Stetefeldt, Howell's Improved White, Brunton's & Bruckner Furnaces, for working base ores. Rotary Dryers, Stetefeldt Improved Dry Kiln Furnaces.

SMELTING FURNACES,

Water Jackets, either Wrought or cast iron, made in sections or one piece, either round, oblong, oval or square. Our patterns most extensive in use. SPECIAL FURNACES FOR COPPER SMELTING. Slag Pots and Cars, improved form. Bullion and Copper Moulds and Ladles, Litharge Cars and Pots, Cupel Furnaces and Cars.

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Large or Small for flat or round rope. Double Cylinder Engines, from 6x10 to 18x60. This latter size furnished J. P. Haggin for Giant and Old Abe Co., Black Hills also Corliss Pumping Engines, 20x60, for Hoisting and Pumping Works, for 2,000 feet deep. Baby Hoists for Prospecting, 4 H. P. to 6 H. P.

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Frue Ore Concentrator, or Vanner Mills.

Coarse Concentrating Works, Improved Jigs, Crushing Rollers, Sizers, Trommels, Rittenger Tables, and all other adjuncts for the proper working of Gold, Silver and Copper Ores, complete in every detail. **HALLIDIE IMPROVED ORE TRAMWAYS.** We refer to Gen. Custer mine, Idaho, 5,000 feet long; Columbus Mine, Col., 4,750 feet long; Mary Murphy mine, Col., 5,000 feet long, all in constant operation.

LEACHING MILLS,

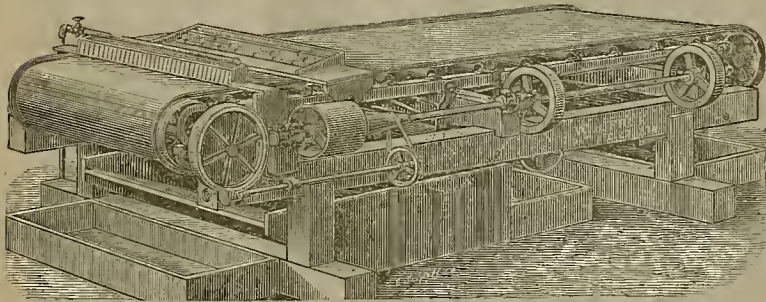
Improved Corliss and Plain Slide Valve Meyer's Cut-off Engines.

CORLISS ENGINES from 12x36 Cylinders to 30x60. PLAIN SLIDE VALVES from 6x10 to 36x36. BOILERS of every form, made of Pine Iron Works C. H. No. 1 Flange Iron, or Otis Steel. Workmanship the most careful. All Rivets Hand Driven.

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\$1,000 CHALLENGE!



THE FRUE ORE CONCENTRATOR,

—OR—

VANNING MACHINE.

Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal.

A machine can be seen in working order, and ready to make tests, at the office of Hincley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That it has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for. That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

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Nov. 6, 1882

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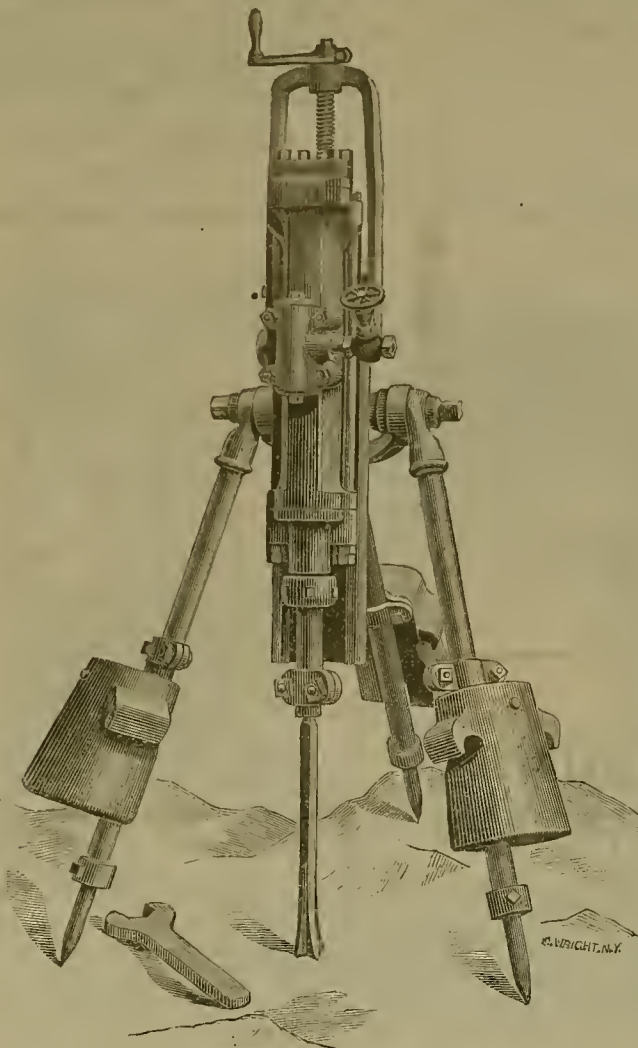
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Send for Circular.

A New Fire Extinguisher.

We examined this week, at 409 California street, a new form of fire extinguisher presenting several novel and improved features which make it a very superior apparatus, overcoming the objections to the old forms. The extinguisher, as the cut represents, is a double tank made of galvanized iron or brass, each tank holding three gallons of water, and connected only by a fine brass double-acting, ball-valve pump.

The chemicals, which are called No. 1 and No. 2, are carried in separate boxes, one on each side, a charge in each box. The tanks are filled with clear water, and in case of fire the chemicals are put in, one package in each tank. The pump is worked with one hand and the hose directed on the fire with the other, the pump drawing from one side water charged with No. 1 and from the other charged from No. 2, the two coming together in the chamber and hose, thus forming a powerful stream of water highly charged with carbonic acid gas, the great destroyer of fire.

This machine is very simple indeed, and is durable because there are no chemicals to corrode the material of its construction. There is never any pressure in the tanks, and there is therefore no danger of their bursting.

This machine can be tested at any time by simply taking a couple of strokes with the pump. Moreover the contents can be replenished in a moment when the charge is out; or water alone can be forced on to the embers when the chemical charge has been expended. There is no danger of a machine exploding on a man's back, as the chamber contains no gas, the gas forming where the streams are brought together in the top of the pump. The apparatus



is set on the ground, and the pump operated in that way, so that a very powerful stream can be sent.

A company has recently been formed to manufacture the apparatus. The machine is called the "Climax Fire Extinguisher," and has been patented.

For miners' use, particularly, this is a very efficient machine, as with it an incipient fire in a shaft or drift can be quickly and readily stopped. A few of the machines, set in the different parts of a mine and always ready for use, would be invaluable, and they are easily and readily operated and are very effective.

Some tests were recently made at the Mare Island navy yard by order of the Secretary of the Navy, and Commodore Phelps, Commandant, reports as follows:

"In compliance with your order of October 16, 1882, directing me to test and report upon the value of a 'fire extinguisher' invented by A. F. Spaw, I respectfully submit the following:

"A pile of light wood, tar barrels, etc., well sprinkled with refuse tar and pitch, about 8 feet in diameter and height, was lighted, and when well on fire the stream from the extinguisher was brought in play. Wherever it struck the fire was at once put out.

"On the 10th inst., another trial of the 'extinguisher' (similar in every respect to the first) was made, with the same result so far as it was concerned; and in competition with a new Martin's, recently charged for the purpose, and showing on its gauge a pressure of 102 pounds, against a separate fire of precisely the same character, it showed a decided superiority. The latter made no impression whatever, and when exhausted the fire was burning as fiercely as at the commencement.

"The principal advantages of Spaw's (not considering the nature of the chemical) are that it is charged only when needed for actual use; is in immediate readiness, and can be re-charged as often as required without interfering with its action; that the charges being kept dry, do not deteriorate any more than the spare ones furnished for the extinguishers (Martin's) now in use; and that the apparatus itself, not being under the continual heavy pressure of those now furnished, do not become useless through leaks."

"The number of real estate sales in San Francisco in 1881 was 2,277, amounting to \$12,233,933, while 2,835 sales, of the value of \$15,127,200, were made in 1882. The increase was, in value, mostly in the business portion of the city. Down-town business property of all kinds has increased in value within a year \$50,000,000. Many properties lying north of California street, which had been for sale for one to three years and could find no buyers, all went off in 1882, and generally at an advance on the old prices.

Overworked men and women, persons of sedentary habits, and others whose system needs recuperation, nerves toned and muscles strengthened, should use Brown's Iron Bitters.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252, Market St., S. F.

FOR WEEK ENDING DECEMBER 26, 1882.

269,613.—LETTER AND BILL FILE.—Frank D. Adams, Auburn, Cal.
269,563.—ORE CONCENTRATOR.—W. P. Davis, Spring City, Nev.
269,556.—STEAM TRAP.—A. L. Fish, S. F.
269,588.—WATCH REGULATOR.—J. C. Landmann, Dutch Flat, Cal.
269,589.—DEVICE FOR BREAKING BALKY HORSES.—Jos. Lucas, Los Angeles, Cal.
269,701.—HEADER AND THRASHER.—Wm. H. Parrish, Salem, Or.
269,719.—DRAFTING INSTRUMENT.—H. C. Root, S. F.
269,610.—SEWING IMPLEMENT.—Maria A. Wilson, Grayson, Cal.
9,907.—TRADE MARK.—Granite Powder Co., S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO. in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

AT New York agents of the leading steamship lines complain that the shipping trade is in anything but a satisfactory condition. The British lines complain of the competition of the small and slow independent steamers known as ocean tramps.

THE officers of the Chicago Exposition propose that the city government allow them 4% dividends on their stock per annum and allow certain annual improvements, and that the balance of money earned be set aside for a public art museum.

PLAIN TRUTHS

The blood is the foundation of life, it circulates through every part of the body, and unless it is pure and rich, good health is impossible. If disease has entered the system the only sure and quick way to drive it out is to purify and enrich the blood.

These simple facts are well known, and the highest medical authorities agree that nothing but iron will restore the blood to its natural condition; and also that all the iron preparations hitherto made blacken the teeth, cause headache, and are otherwise injurious.

BROWN'S IRON BITTERS will thoroughly and quickly assimilate with the blood, purifying and strengthening it, and thus drive disease from any part of the system, and it will not blacken the teeth, cause headache or constipation, and is positively not injurious.

Saved his Child.

17 N. Eutaw St., Baltimore, Md.

Feb. 12, 1880.

Gents:—Upon the recommendation of a friend I tried BROWN'S IRON BITTERS as a tonic and restorative for my daughter, whom I was thoroughly convinced was wasting away with Consumption. Having lost three daughters by the terrible disease, under the care of eminent physicians, I was loth to believe that anything could arrest the progress of the disease, but to my great surprise, before my daughter had taken one bottle of BROWN'S IRON BITTERS, she began to mend and now is quite restored to former health. A fifth daughter began to show signs of Consumption, and when the physician was consulted he quickly said "Tonics were required," and when informed that the elder sister was taking BROWN'S IRON BITTERS, responded "that is a good tonic, take it."

ADORAM PHELPS.

BROWN'S IRON BITTERS effectually cures Dyspepsia, Indigestion and Weakness, and renders the greatest relief and benefit to persons suffering from such wasting diseases as Consumption, Kidney Complaints, etc.



Goods and the "GARLAND" IMPROVED SEWER GAS TRAP MFG CO., 1501 Broadway, Oakland, Cal.

THE "Garland" Patent SEWER GAS TRAP Is a sure shut-off against Sewer Gas and Back Water. The Loaded Metal Ball Valve is slightly heavier than water. This Trap can be put in at small expense, and is warranted to give satisfaction. Highly recommended by leading Architects and Plumbers. Used in all new, first-class buildings in San Francisco, including Phelan Block. For sale by all dealers in Plumbers' Goods. Sent by mail on receipt of \$2.50. Send for 125 page Illustrated Catalogue of 3000 Standard Goods on every subject. Agents wanted. National Book Company, 73 Beckman Street, New York

Mining and Other Companies.

Persons interested in incorporation will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, January 2, 1883

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 50, of twenty five cents (25c.) per share, was declared, payable on Friday, January 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company in New York.

WM. WILLIS, Secretary.

OFFICE—Room 20, Nevada Block, No. 309 Montgomery St., San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Navajo Mining Company.

San Francisco, January 3, 1883.

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 5, of twenty five cents (25c.) per share, was declared, payable on Friday, January 12, 1883. Transfer books closed on Saturday, January 6, 1883, at 12 o'clock M.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine St., San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company.

San Francisco, December 26, 1882.

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 14, of five cents (5c.) per share, was declared, payable on Friday, January 12, 1883. Transfer books closed on Tuesday, January 2, 1883, at 3 o'clock P. M. This dividend is payable at the Farmers' Loan and Trust Company in New York on all stock issued there, and at the office in this city on all stock issued here.

WM. WILLIS, Sec'y.

OFFICE—Room 29, Nevada Block, No. 309 Montgomery St., San Francisco, Cal.

DIVIDEND NOTICE.

San Francisco Savings Union

532 California Street, cor. Webb.

For the half year ending with December 31, 1882, a Dividend has been declared at the rate of four and thirty-two one-hundredths (4.32) per cent. per annum on term deposits and three and sixty one-hundredths (3.60) per cent. per annum on ordinary deposits, free of Federal tax, payable on and after Wednesday, January 17, 1883.

LOVELL WHITE, Cashier.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending December 31st, 1882, the Board of Directors of THE GERMAN SAVINGS AND LOAN SOCIETY has declared a dividend on Term Deposits at the rate of four and thirty-two one-hundredths (4.32-100) per cent. per annum, and on Ordinary Deposits at the rate of three and six-tenths (3.6-10) per cent. per annum, free from Federal Taxes, and payable on and after the 2nd day of January, 1883. By order, ORO. LETTE, Secretary.

Attention, Boiler-makers and Engineers!

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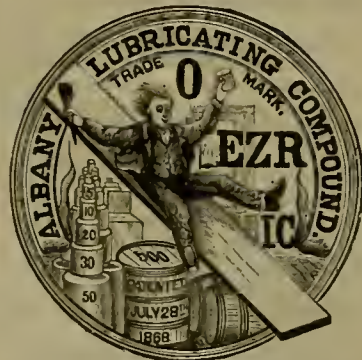
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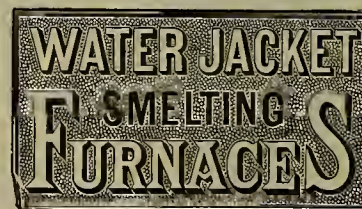
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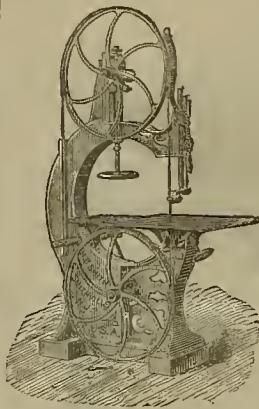
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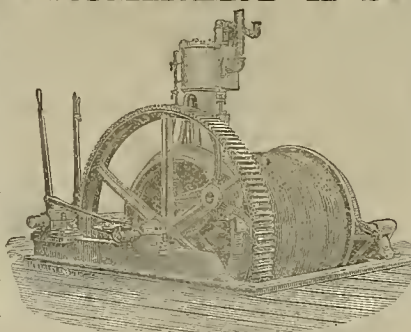
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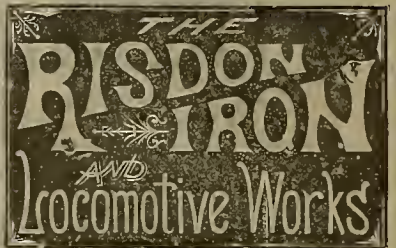
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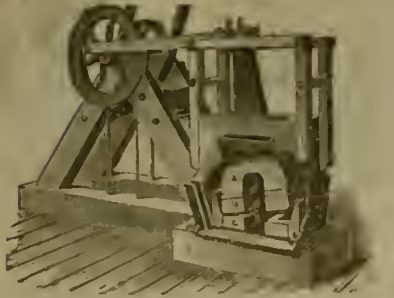
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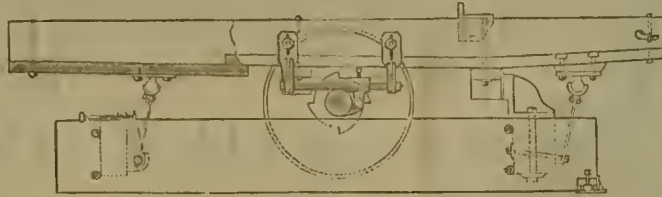


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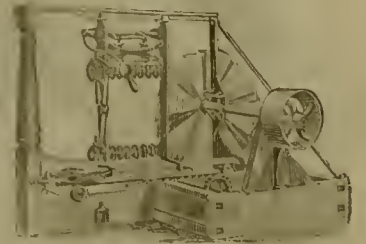


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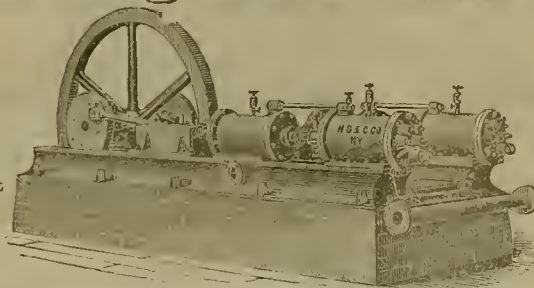


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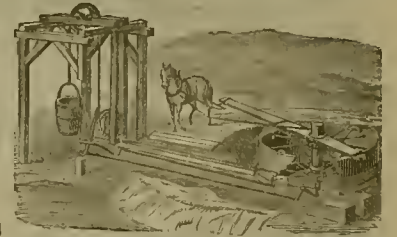
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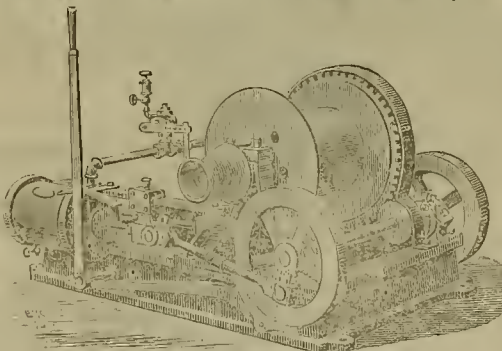
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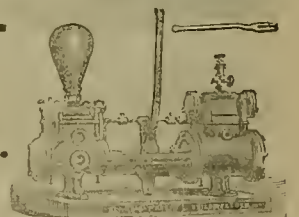
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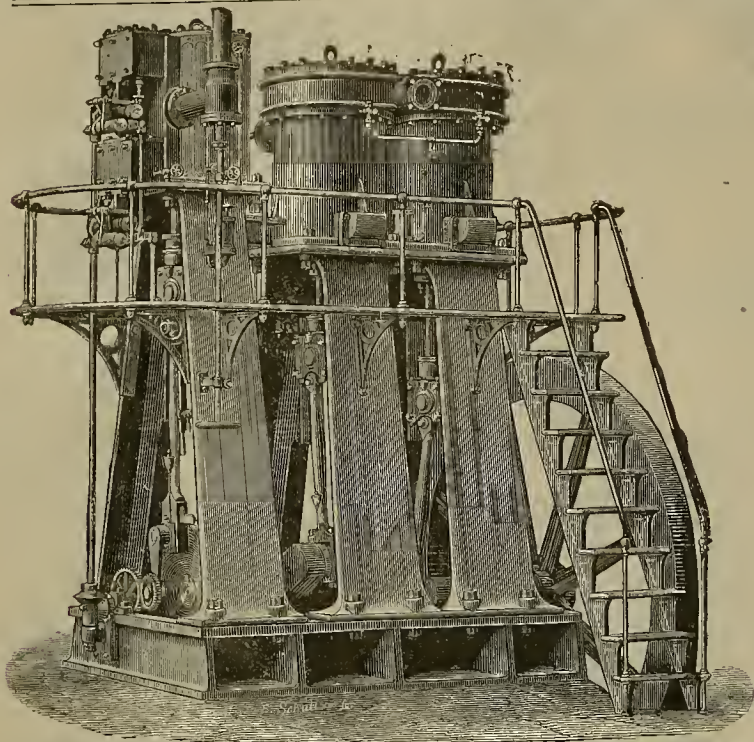
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SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

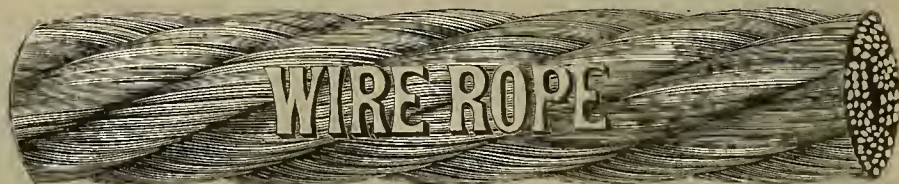
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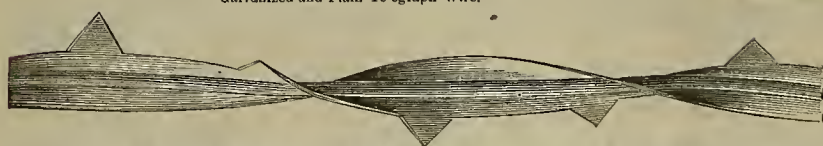
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A BARGAIN.

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R. H. McDonald,
President,
San Francisco,
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Established 1863.
Capital Stock \$1,000,000.00
Surplus 460,800.70

San Francisco, Cal., July 1, 1882.

We take pleasure in presenting for your consideration the following Thirty-eighth Semi-Annual Statement of the condition of this Bank:

RESOURCES.

Bank Premises.....	\$150,000 00
Other Real Estate.....	12,825 35
United States Bonds.....	629,507 60
Land Association Stock.....	15,121 55
Loans and Discounts.....	1,785,000 20
Due from Banks.....	527,279 09
Money on hand.....	632,365 30
	\$3,752,099 09

LIABILITIES.

Capital paid up.....	\$1,000,000 00
Surplus.....	460,800 70
Due Depositors.....	1,953,672 80
Due Banks.....	337,491 09
Dividends unpaid.....	134 50
	\$3,752,099 09

This Bank has special facilities for doing all kinds of banking business.

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Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

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STROUDSBURG, MONROE COUNTY, PA.



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Orders may be addressed to us at any of the following places, at each of which we carry a stock.

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Nos. 2 and 4 California Street.

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And 40 Franklin Street.

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Two Gold, one Copper and one Antimony, for CASH CUSTOMERS. Mines will be as good as sold if first-class and accompanied with favorable Reports from Experts of known reputation. No PROSPECTS wanted, and no mine without an Expert Report will be entertained. Apply in person or by letter to

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SEND FOR NEW CATALOGUE & PRICE LIST. CLAYTON STEAM PUMP WORKS 14 & 16 WATER ST., BROOKLYN, N. Y.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 13, 1883.

VOLUME XLVI
Number 2

Miners' Association of California.

The State Miners' Association is again calling upon the miners of California to contribute to the fund to enable the Association to meet the expenses of the continued litigation against the hydraulic miners by the anti-debris men. It will be remembered that this Association when first formed was composed only of hydraulic miners; but now quartz miners are also enrolled. The Association is sending circulars to miners in all parts of the State, asking for aid. The circular is as follows:

OFFICE MINERS' ASSOCIATION,
320 Sansome St., Room 23,
San Francisco, Jan. 1, 1883.

DEAR SIR:—Your locality will soon be visited by an accredited agent of this Association, who will on its behalf solicit contributions to the "defense fund" of the Miners' Association.

We call the attention of your citizens to the magnitude of the litigation pending in the United States and State courts. All the prominent companies have been sued and many are enjoined.

Our opponents aim at nothing less than the suspension of the mining industry. It is a mere question of time when service will be made on all class of mines.

To that end, our opponents are collecting a large fund for the employment of lawyers, engineers and witnesses, and are organizing their forces with a further view to legislation hostile to the miners in the Legislature of 1883.

Not content with appropriations of \$1,000 from their respective city and county treasuries, they have appealed to all classes for pecuniary aid. The land owner contributes according to his means, represented by taxable value of his property. The laborer is called upon to pay his contribution, and the women and children have been solicited to donate their savings. Their organizations extend from the mouth of the Sacramento to its head, and from the Coast Range to the Sierra Nevada. No person can refuse to contribute under the penalty of social ostracism.

And yet how insignificant their injuries, either proven, alleged or threatened, to the great calamity which would befall the mining counties, if they should prevail in their endeavor to crush the business of mining! In a few years the mountain counties would present a scene of depopulated towns, empty school-houses and decayed churches. The fairest portion of our State would present an appearance more sad than that of provinces ravaged by war, famine and pestilence.

The burden of the defense of this great industry has fallen on a few companies, handed together under the name of the Miners' Association, and controlled by the advice of the leading miners of the State. Owing to the closing of some mines by injunction and the suspension of work in others, through the prevailing system of terrorism, and the expense of building dams, voluntarily incurred, the resources of the companies comprising the Association have been crippled, and we are compelled to adopt the tactics of our opponents and ask contributions from all classes of persons—for all are interested in the protection of their homes.

With a view to promote this object we ask you to give us your personal influence, and suggest that in each town and camp a subscription list be opened at the place of business of our local agents, where contributions may be received and retained until the arrival of our special agent, or be remitted to the main office in San Francisco. In either event, official receipts will be issued to the donors.

The name and standing of the Board of Council directing the policy of the Association, and its record in the defense of the mining industry, whenever and wherever attacked, is a guarantee that the mining interest will be protected in the future as in the past.

HAMILTON SMITH, JR.,
President.

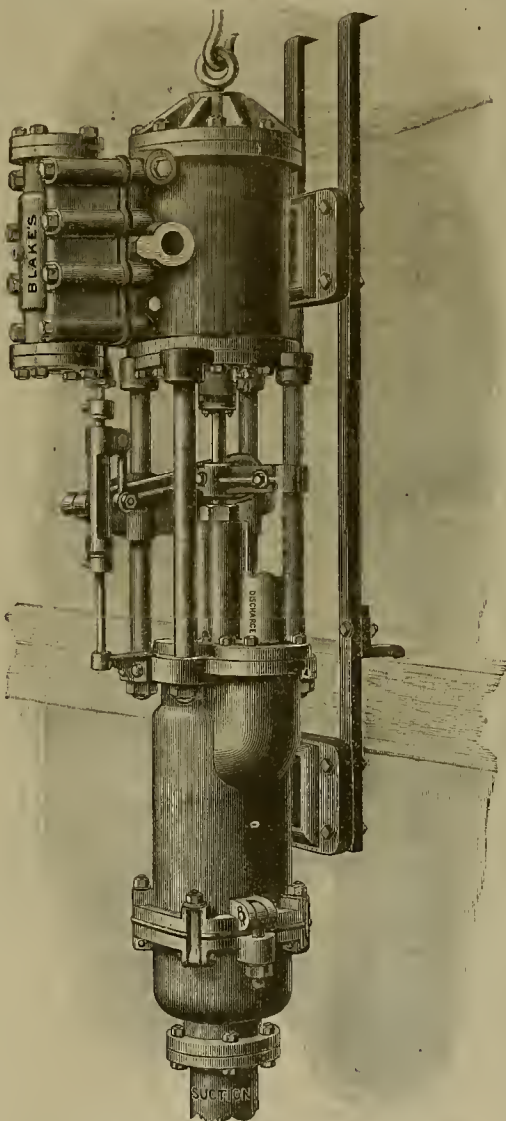
W. A. SKIDMORE, Secretary.

DURING the past year five Michigan mining companies paid their stockholders \$340,000 more than the actual paid-up capital of the companies.

The Tariff and Mining.

The miners of the country are as much interested in the questions connected with the tariff as any class of the community. In fact, they are very much more interested than most persons. The imposition or removal of a duty means often to them profit or loss, a continuance or stoppage of business. Just at the time when the tariff is being considered by Congress

timony, 10% *ad valorem*: borax, 10 cents per pound, while its value in the market is only 10 cents per pound; copper, 3 cent per pound; tin, 15% *ad valorem*; steel, 30% *ad valorem*; copper ore, 3 cents per pound; copper, in plate and bars, 5 cents a pound; nickel, 30 cents a pound; brass, 15% *ad valorem*. Manufacturers of brass, iron, lead, pewter, tin, etc., not otherwise provided for, pay 35% *ad valorem*, under which clause the quicksilver miners must pay 35% duty on iron flasks. Gunpowder used for



BLAKE'S SINKING PUMP FOR MINES.

and a revision is being made, the miners are uneasy. The quicksilver and lead miners particularly are watching carefully what is being done. We give in other columns of this number of the PRESS full statements of the case of both these interests. The lead miners protest against a reduction of the tariff, claiming that it would ruin the business of lead mining by making it unprofitable. The quicksilver miners ask to have a duty imposed on that metal, as was formerly the case, the absence of any duty working a hardship to their industry, and having caused the closing down of many mines in California.

California is not so much interested in the lead as in the quicksilver, as she is sole producer of the latter in this country, while of the former she produces very little. Quicksilver was put on the free list by Act of February 8, 1875. Under the present tariff the following minerals and ores are protected by duty: An-

timony has a duty of 6 cents a pound, or 20% *ad valorem*.

The mining community should give close attention to these tariff questions, and should act together to protect their interests. A passive grumble at proposed adverse legislation is of no use, but active measure must be taken. The quicksilver and lead miners have both presented their ideas of the question to Congress in the form of memorial and protest, and by united action hope to gain their points.

MADE INSANE BY NOXIOUS GASES.—At the Albion works, Enreka, McDonald, a smelter, who had been in one of the tunnel fume escapees to make some repairs, was overpowered and rendered unconscious by noxious gases. When resuscitated McDonald was for a time violently insane. He seized a sledge hammer and charged upon his friends. Being overpowered and sent to bed he came out all right in a few hours.

State Mining Bureau.

Governor Perkins, in his message to the Legislature, has the following to say commendatory of the State Mining Bureau:

I commend the report of the State Mineralogist to your careful consideration. It is one of the most important documents submitted for your investigation. At a comparatively small cost, it contains more practical information relative to the mineral wealth of the State than will be found in the reports of the State Geological Survey, at an enormous outlay. The appointment of Professor Henry G. Hanks as State Mineralogist was a fortunate selection, and I take pleasure in thus publicly acknowledging his services, eminently deserved by his unceasing exertion and devotion in advancing the interests and influence of the Bureau. Its usefulness has been recognized by the leading scientific institutions of Europe and America, attested by a voluminous correspondence on file in his office.

The catalogue of its collection of minerals, metals, and other articles, bears testimony to the labor required, and which must have been expended, not only in procuring, but in placing them in classes appreciable to the visitor; and I would here suggest the propriety of transferring the mineral collection now in the State Library to the Bureau. It will be seen by the financial exhibit that it will be impossible to continue the Bureau unless an appropriation is made for its future support. The State should pay from the General Fund the salaries of the Mineralogist, Secretary, Chemist and Janitor, and the rent and the insurance of the building; and permit the money raised by the provisions of the Act to be used for the benefit of the Museum proper, the traveling expenses of the State Mineralogist, incidental expenses, and such extra help as I am satisfied is at times required. To remove the burden and responsibility which so important a trust devolves on one person, I would recommend the Act creating the Bureau be amended by placing its management under the charge of a Board of Trustees, who, in connection with the State Mineralogist, shall have the control and supervision of the same. This is also the desire of Mr. Hanks, as expressed in his report.

The Blake Sinking Pump.

The engraving on this page represents Blake's Improved Sinking Pump of the vertical double-acting plunger pattern for mining operations, sinking well-shafts, etc. For sinking new shafts, recovering old mines that have been "drowned out," and for mining operations requiring the use of a light, portable and efficient steam pump, or for sinking wells and general excavation work, this improved sinking pump is especially adapted.

The pump being vertical requires but little room in the shaft. It will throw a steady continuous stream of water, and will work equally well when hanging by the tackle or when hooked to the timbering. Ten sizes of this style of pump are made, with capacities from 33 gallons a minute up to 400 gallons, and from 7 to 18 inches stroke. Estimates will be furnished also by the agents for larger sizes when required.

The pump is arranged with a strong bolt, as shown, firmly imbedded in the upper steam cylinder head, to which tackle for raising or lowering can be readily attached. Adjustable wrought iron dogs for hanging the pump to the shaft timbering are bolted to the cylinders. The lower plunger works on a removable cylinder of gun-metal composition, which can be readily replaced with but little trouble and expense by a new one when worn out. The water valves are of the best vulcanized rubber and work on seats of gun-metal composition. Swing bolts admit of easy access to the crater-valve and pump-barrel. The details of operation of the Blake mining pumps are well known to mining men, and this one differs only in form, the valve, etc., being all on the same general principle. H. P. Gregory & Co., mining machinery and supplies, 2 and 4 California street, in this city, are general agents for the Blake pumps.

California State Geological Society.

President's Annual Address.

In the last number of the PRESS we gave the result of the annual election of this society, and promised to give this week the annual address of President Hanks, which was as follows:

On retiring from the office of President, with which you have honored me, it will be fitting to give you a history of the Society since its commencement, and some account of its doings, what it has accomplished, and what may be hoped for in the future.

The California State Geological Society was organized for the purpose of making a State geological collection, while the facilities for doing so were better than they would be in the future, owing to unusual activity in prospecting, caused by the discovery and development of rich mines of gold and silver in California and Nevada.

The first meeting of the Society was held Dec. 22, 1876, and the incorporation papers filed Dec. 30, 1876. As it was thought upon due deliberation that a limited number of active workers could secure that end sooner than a cumbersome organization, the number was limited to 10.

It was thought by the projectors that at least 10 years might elapse before a collection could be made worthy of the acceptance of this State. Unexpected success attended the efforts of the *decemviri*, and the acquisitions soon became valuable and extensive, growing quite beyond the expectation of the society.

The Society and the Mining Bureau.

In 1880 the Hon. Joseph Wason, a member of the Legislature, became interested in the society's doings, and proposed to introduce a bill to establish a Mining Bureau and State Museum. The matter was brought before the society, by whom it was thought too early to make the attempt. Mr. Wason, however, differed in opinion; the bill was introduced, meeting with success, and the institution was created, the Mining Bureau bill being approved April 16, 1880.

The main object of the society being thus unexpectedly accomplished, meetings were for a time discontinued, but the interest of the members did not wane. At a meeting held May 29, 1880, the collections, consisting of 1,327 geological specimens and 103 books and pamphlets, were presented to the State by the following resolution:

On motion, duly seconded, it was

Resolved, That the entire collection of minerals of this society, its books, and all of its property, except its desk, record book and seal, be, and the same are, hereby donated to the State of California, subject to the conditions set forth in the by-laws of the society. The President and Secretary are hereby authorized to make the necessary conveyance, and the Secretary is directed to deliver all of said property to the State Mineralogist, to be by him held in trust for the State of California.

On motion, duly seconded, it was

Resolved, That the specimens and books hereafter received by the society be given as fast as received to the State Mineralogist for the State Mining Bureau.

It was understood that in due time the meetings would be resumed, and the society, having no property, nor desiring any, would become a purely scientific one, and would direct its energies toward building up the State Museum and Mining Bureau.

The reasons for a limited membership having ceased to exist, it was decided to modify the by-laws to admit of increase to any extent. With this view, at a meeting held September 21, 1882, a committee was appointed to revise the by-laws, consisting of Messrs. W. S. Keyes and S. Heydenfeldt, Jr., who reported at the next meeting the revised by-laws, which were accepted.

The change of laws abolishes all classes and permits unlimited membership.

It was decided that this, the sixth anniversary, should be the era for the new dispensation, and I trust that the California State Geological Society will now, as proposed, take a new start and assert itself.

The proceedings of the Society have been quietly conducted, but, while it has accomplished more than was expected, or even hoped for by its founders, it has been too modest and too retiring in its character. While its membership in California has been small, its numbers among its associates abroad some of the most noted men of science.

Since its organization the Society has lost seven members by death. Of the original ten, Joseph Roberts, Jr., and Thomas J. Owens have died. Of associate life members, four have been taken from us, Louis V. B. Howell, Frederick MacCrellich, Seth Robinson and John D. Barry. Of corresponding members Charles Darwin is the only one of whose death we have received notice.

The State Geological Society greatly assisted the Paris Exposition Committee in their efforts to have the mineral resources of the State and the Pacific coast represented at the World's Exposition of 1878, which became a success on receiving material aid from the generous John W. Mackay.

State Museum.

It has been the desire of California Legislatures in years past to provide for a State Museum, but circumstances have interfered with its accomplishment.

In 1878 the Act of the Legislature creating

the State Geological Survey provided in Section 1 for a State Museum in the following words:

J. D. Whitney is appointed State Geologist, whose duty it shall be, with the aid of such assistants as he may appoint, to make accurate and complete geological survey of the State, and to furnish in his report of the same proper maps and diagrams thereof, with a full and scientific description of its rocks, fossils, soils and minerals, and of its botanical and zoological productions, together with specimens of the same, which specimens shall be properly labeled and arranged, and deposited in each place as shall be hereafter provided for that purpose by the Legislature.

In the preface of "Geology," Vol. I, folio 24, Prof. Whitney states that a large collection has accumulated, but that no provision had been made by this Legislature for a museum. Owing to this oversight, the fine collection made by the Geological Survey was destroyed by fire when stored in a warehouse supposed to be fire-proof, and, like the destruction of the Alexandrian Museum, on a lesser scale, a vast amount of valuable material was lost to the State, to the world and to science.

The same danger menaces the well advanced and very valuable museum of the State Mining Bureau and the inestimable collections of the California Academy of Sciences.

The Legislature of 1862-3 passed a joint resolution appointing a committee, consisting of Prof. J. D. Whitney, John Swett and J. F. Houghton, to report to the Legislature upon the feasibility of establishing a State University, an Agricultural College, a School of Mines and a Museum.

Prof. Whitney, in a lecture before the Mechanics' Institute held at Platt's Hall, Jan. 28, 1864, calling attention to the importance of a State Museum, said: "The interests of the State demand that these collections should be placed in a fire-proof building, which may be called the State Museum, where they will be accessible for the purpose of instruction, not only to the student, but to the general public."

Through the instrumentality of the State Geological Society and Acts of recent Legislatures, the foundation of the desired State Museum is already laid. As may be seen by an inspection of the cases of the Mining Bureau and the nucleus library of the same, the institution is not to be despised.

I congratulate you on the results of your efforts, to which are mainly due the accomplishment of this object.

When an institution in the interest of the general public is once established, it grows rapidly, for the reason that it is the inevitable destiny of private collections made by students, amateurs and specialists, to centralize, to gravitate to and become absorbed in great museums. No matter what they may think or do during their short lives, this will be the certain and final disposition of their collections. And this is right, for in no other way could the world be so benefited. Collectors hoard with a miser's acquisitiveness their small local collections, and gather together what will be of inestimable value in a scientific and practical sense, to those who follow, and while future generations will not thank them individually, they will not and cannot ignore the obligation. This is the experience made in all countries where museums have grown up, and the great collections in the world's centers are aggregations of small ones made principally by individuals. The same will be the case on the Pacific coast. There is no city in the world where a complete Geological Museum is more needed, or will be more appreciated than in San Francisco.

Scientific Men of the Pacific Coast.

I feel it my duty to say something on this occasion in favor of the scientific men of California and the Pacific coast, for they do not always receive the credit they deserve. This class must include not only those who have attained eminence, but students with a bent toward scientific studies, who are equally deserving of respect and consideration. The prospectors also, as a class, must be included, for their pursuits create in them a desire to investigate the laws of nature, the results of which they see on every side as they scour the hills and valleys in search of mineral veins and deposits. As a class they would be scientific men if their most earnest desire could be accomplished. The want of education in some cases and adverse circumstances in others have defeated their aspirations. They are, as it were, rough diamonds, deficient merely in the polish that can only be imparted by education. It can be shown that this State and the world have been benefited by the labors of these men to a much greater extent than can ever be repaid, and it is only justice to them to put in a claim for educational facilities to fit them for the better accomplishment of their labors.

There is a class of scientific workers whose happiness depends on the pursuit of knowledge. They may be found in almost every part of the State and in every social condition. In the large cities they institute societies in which they toil for years in poverty, to be at times ridiculed, and but seldom encouraged or appreciated. They may be found in the mountains in rough dress, with mining tools on their shoulders, climbing hills while looking for mines of silver, gold, lead, copper and other metals, or searching the deserts for deposits of salt, borax and soda. It is through the efforts of this class of men that the glorious State of California is 100 years in advance of the frontier Territory

it would have been had the land been suited only for agricultural purposes. They were the pioneers who paved the way for the railroad made known the physical features of the country, and made it possible for us to rear our families in safety on lands which but a few short years ago were the range of the savage and of wild animals. While they believed they were working for themselves they were in reality the agents of a providence which has given to the world a California and a Pacific coast.

Scientific men generally become so without any premeditated plan; on the other hand, attempts to make them to order generally result in failure. Scientific men, and especially those who become noted as such, are too frequently jealous of each other. But I will not say that these very jealousies are not productive of good, and the world benefited by the rivalry thereby engendered. They should more generally join forces and work in harmony, give their ideas and the results of their original researches to the world for the benefit of mankind during their lives, rather than (by the posthumous publication of their works) be referred to after death as noted men of science.

"A prophet is not without honor save in his own country"—so a scientific man is seldom appreciated during his life. History is filled with such examples. They are generally poor and their pursuits tend to a continuance of that condition, and as they seldom become wealthy by the practical application of the discoveries they make, they should at least be indulged in their peculiarities and thanked by those who gain riches, health and convenience from their labors.

Mining Schools.

To aid prospectors in their labors and studies there should be some institution, fostered by the State, where men wishing to spend a few days, or weeks, in learning to distinguish minerals or to assay ores, could be able to do so without expense and without preparatory study, by simply making application and expressing the desire.

There should be a grand library of practical and scientific books, special works of reference, to which all should have free access during suitable hours daily, with conveniences for making memoranda. These books, being of a reference character, and unlike those in public libraries, should never be permitted to leave the rooms, and should be carefully watched to prevent mutilation and theft.

California is one of the largest States in the Union, having an area of nearly 189,000 square miles. A corresponding sea coast on the Atlantic side of the continent would extend nearly from Boston to Savannah. With such a vast scope of only partially explored territory at your feet, you will have ample opportunity to employ your leisure in collecting geological facts and leave something to be done by future generations. Scientific men in older countries envy us the new field open to our investigations, and look to us for original work.

I trust the California Geological Society will not only do all in its power to collect information relating to this almost virgin field, but also publish its proceedings for the benefit of the world.

The Tariff on Lead.

Vigorous Protest Against a Reduction.

The American Association of Mining Industries has issued the following "Protest A," which is being circulated in Colorado for signature:

To the Honorable the Senate and House of Representatives of the United States:—As miners and men of business, desiring to see our country prosperous and progressive commercially, socially, and in all other advantageous directions, and recognizing the indubitable fact that the trades and industries which, when flourishing and self-sustaining, lead to this worthy end, and that these trades and industries depend largely upon each other for their aggregate success, we earnestly and anxiously protest against any movement for reductions in the tariff on lead and copper and their ores.

The mining and reduction of base ores, especially those of lead and copper, form one of the strongest interests in the State; an interest in which much of the present prosperity of the State, and that which is anticipated, lies, and we desire to present to your honorable bodies that the contemplated reduction of tariff upon the ores and metals named would utterly ruin and shut off this industry, for only under the protection of the tariff can it be possible to conduct the work of mining and reducing lead and copper with that success which would lead to any extensive operation therein.

The greatest commentators upon tariff questions, and even those who have most strenuously advocated free trade, have agreed that it is most expedient to give tariff protection to certain industries in new countries, provided the country under consideration has good natural resources for the prosecution of the industry thus to be protected.

Without intent or desire to discuss tariff matters, further than to present our just claim in the single proposition in hand, we beg leave to offer that ours is certainly a new country, and that there can be no manner of doubt as to its natural resources in the direction suggested, or that the industry and interests involved have most prospered under tariff protection against foreign competition.

To abolish this protection against foreign lead

and copper is to paralyze not only the direct industries which mining and reducing them fosters in this State, but it would seriously injure many and other important industries that are largely dependent upon the first named to wit: the manufacturing industries which manipulate lead and copper, and which give employment to thousands; the merchants and farmers who supply the miners and artificers of these metals with the necessities and comforts of life in the way of food, clothing, etc.; the railroads and other common carriers, and other various branches too numerous to specify, in trade and commerce, which the interests mentioned permeate and ramify.

It is this multiplying and diversifying of the departments of home industry, bringing the farmer, the mechanic, the merchant, the manufacturer, the miner, and the common carrier, into immediate contact and community of interest, enabling them to interchange their products, necessities, and accommodations, which makes any country, and especially a new one, successful and prosperous.

The high price of coals and other material, the use in mines of large quantities of steel and iron, the heavy machinery required that must be taken into them to work them, incur not only great cost in purchase, but a vast expense in freight, and it is certain, therefore, that but for the protection afforded by the tariff on lead and copper, so largely produced in this State, not a pound of either would have been produced, and for the same reason a reduction of the tariff would operate to hinder and shut off the production. The tariff is, in short, the very life of the industries mentioned and those correlative.

That the prosperity of the whole country is the first thought and aim and care of your honorable bodies, we entertain no doubt, and we submit that in order to foster the industries of the whole country as an aggregate, those of sections should be encouraged, sustained, abetted and upheld in detail. In Colorado all branches of business are made more valuable and prosperous by the protection of her mines, which enables her people to work them and render them productive and valuable to the State and the world.

The lead and copper interests of Colorado, though yet in their infancy, are capable of prolific production of wealth, and will be extensively advanced by the prosecution of operations in the present mines, the opening of new ones, and the erection of numerous additional works for the reduction of ore, if your honorable bodies heed our petitions and memorials, and thus insure the protection desired, which is, beyond peradventure, a *sine qua non* in the premises.

The Leadville Protest.

The miners and smelters of Leadville, Colorado, have signed a protest addressed to the Committee on Finance of the Senate, and to the Committee on Ways and Means of the House of Representatives, and filed with the said committees on December 23, 1882. The protest is as follows:

The undersigned, who are well acquainted with the lead industry of Leadville, Colorado, and of this country, respectfully submit the following facts for the consideration of your honorable body.

Until the tariff on lead ores was threatened with a reduction the price of lead was \$100 a ton. At that rate the Leadville smelter can pay \$40 a ton for the lead in the ore. The remaining \$60 is consumed in loss in treating, freight, rebating, commissions, etc. With the present tariff of two cents per pound on lead, equivalent to \$40 a ton, lead cannot be imported at a profit; with the tariff reduced to one and one-half cents per pound, equivalent to \$30 a ton, lead could be imported and sold at a profit with a slight advance on \$90 a ton. At \$90 a ton the Leadville smelter could only pay \$30 a ton for lead.

Product of Colorado.

Leadville and its adjoining and tributary camps (Red Cliff, Kokomo and others) now produce about 1,000 tons of ore per day, or at the rate of 300,000 tons per annum; 100,000 tons of this ore now net the mine owner not to exceed \$2 a ton. This ore averages from 25 to 30% lead, for which the smelter now pays at the rate of 40 cents per unit, but for which he could only pay at the rate of 30 cents per unit, with lead at \$90 a ton, i. e., the mine owner would receive 10 cents a unit, or from \$2.50 to \$3.00 a ton less for his ore, which exceeds his present profit.

Of these 100,000 tons not to exceed 10,000 tons are mined in mining the richer ores, so that the remaining 90,000 tons would not be mined at all in the case of a reduction of the tariff. These 90,000 tons would cost an average of \$12 a ton to mine, equal to \$1,050,000, and \$12 a ton to reduce, equal to \$1,050,000 more, or a total of \$2,100,000, the whole of which sum is now expended in this camp as follows: Labor, \$1,500,000; supplies, \$650,000. As it costs no more to mine and reduce the higher grades of ore than the lower, the reduction of the tariff by one-half cent per pound on lead would reduce the demand for labor and supplies in this camp to two-thirds of the present. In addition to this loss to labor and supplies, the mine owner and the smelter together would lose a profit of about \$360,000 on the 90,000 tons of ore that could not be mined with the reduced tariff, and the mine owner would in addition thereto lose about \$320,000 on the lead produced from the

(CONTINUED ON PAGE 23).

MECHANICAL PROGRESS.

What Dr. Seimens Expects From the Gas Engine.

In his 1883 inaugural as President of the British Association, Dr. Seimens suggested that the time might not be far distant when the gas engine would displace on board our ships the somewhat complicated and dangerous steam boiler now in use. The advent of such an engine and the dynamo machine he declared must mark a new era of material progress, at least equal to that produced by the introduction of steam power in the early part of the century.

The great advantage of the gas engine is believed to be in its saving of fuel. According to Dr. Seimens the best steam engine yet constructed does not yield in mechanical effect more than one-seventh part of the heat energy residing in the fuel consumed, when as the factor of efficiency of the gas engine is one quarter. If, therefore, it shall be adapted to vessels, the gas engine, being of half the weight of the present steam engine and boilers, and working with only about half the present expenditure of fuel, will admit of an addition of 30 to the cargo of an "an Atlantic propeller vessel—no longer to be called a steamer." That improvement accomplished, the balance of advantages in favor of such vessels would be sufficient, as he says, to restrict the use of sailing craft chiefly to the regatta of sportsmen.

As it is now, steam is rapidly driving sails from the ocean, just as iron and steel are superseding wood for ship construction. Out of the 780 vessels building, or preparing to be built, in the United Kingdom on the 30th of June last, only 130 were sailing craft, while 650 were steamships; and of this whole number only 49 sailing vessels and 6 steam vessels were of wood, while steel, or homogeneous iron, which is destined to become the great material for ship building, was used for 89 steam and 11 sailing vessels.

The great advances hitherto made in steam vessels have been in the direction of saving fuel in lighter machinery, in the substitution of the screw for side wheels, and in the use of iron and steel instead of wood for their construction. A wooden ship could not be built to perform like the *Alaska* or the *Arizona*. Whereas in the days of the old Colline line the steam was expended only twice, and the pressure carried was only 15 lbs.; the expansion now is 10 or 12 times and the pressure is 90 to 100 lbs. The old *Canardere*, the *Asia*, *Africa*, and *Canada* carried a pressure of only 10 lbs.

The consequence has been the enormous increase in the size of the ocean steamers and the great advance in their speed. In April, 1883, the *Sirius* first crossed the Atlantic in 17 days from Liverpool and 15 days from Queenstown. She was of 700 tons and 320-horse power. The *Servia*, built in 1881, has an extreme length of 530 ft., and a displacement of 13,000 tons. The *City of Rome*, built in the same year, is 600 ft. long, and has a displacement of 13,500 tons. The *Alaska*, which is 500 ft. long, and of 12,000 displacement, has done the distance between Queenstown and New York in 7 days, 4 hours and 32 minutes, and the return voyage in 6 days and 22 hours, a mean ocean speed of about 17 knots an hour, or more than double that of the first steam vessel which crossed the Atlantic.

Undoubtedly, if the gas engine shall be able to do what Dr. Seimens anticipates, it will give ocean navigation another and a strong impulse. Its far greater lightness, as compared with the steam engine and boilers, and its smaller consumption of coal to produce the same effect, will admit of a much larger cargo, and greater speed may be obtained without too much sacrifice of the cargo capacity of the vessel.

Length of Rails for Railways.

A new question among railroad men has recently sprung up regarding the most profitable and economical length for rails in the track. Up to 10 years ago, a rail 16 ft. in length was in general use; then the more prominent lines began laying a 32-foot length rail. Now several roads are introducing a rail 60 ft. in length, and as soon as the new mill in Chicago is fairly in operation, rails 120 ft. in length are to be manufactured and tested on one of the north-western lines. This mill will be the only one in the country to construct that a 120-foot rail can be turned out. The argument in favor of long rails is the fact that the chief wear on the rails is at the joints, which become battered usually long before the body of the rail is much worn. Then it is further argued that the wheels under the cars will wear a third longer on a 120-foot rail, they being more worn in pounding the ends of the rails than in the actual turning of the wheel. It will be noticed further that with the lengthening of the rail a heavier rail is taking the place of a lighter one, but few first-class roads now laying a rail lighter than 60 pounds to the yard. They claim that with a rail 120 feet in length, Champions of the long rails favor a rail that will weigh 70 or 80 pounds to the yard, weighing 80 pounds to the yard, a track will last a quarter of a century, with slight repairs in the way of new cross-ties. One objection will be, however, its great weight, which will make it difficult to handle, unless it be done by a derrick car.—*Mechanical News*.

A Helping Hand.

The boys who succeed in life are generally those who are always ready to lend a helping hand. The same is true with workmen generally, wherever they may be. During the progress of the boilermakers' strike in New York, a steamship needed some repairs on her boilers before she could sail. Nothing would induce the strikers to undertake the work. In the emergency the chief engineer appealed to his crew to help him out of the difficulty. This the latter cheerfully consented to do, and set to work with a will, finishing the job in time for the regular trip. The proprietors of the works where the repairs were made recognized the service by paying full time to the crew, and it is probable that these men will never have occasion to regret their action in this instance. They were not, however, obliged to do it. It was not the duty for which they were paid, and had they possessed the spirit of some workers they would have declined to touch the job. Many men, especially young men, have the idea that the performance of any service outside of the prescribed routine is a blow at their independence. John, who is engaged on the hooks, grumbles because his employer asks him to close the store in the absence of the porter.

The men who succeed, however, are they who are occasionally willing to sink dignity in the interest they feel in the business in which they are engaged, and who are not sticklers for an over-strict construction of the terms of their contract. The painter who drops his brush at the stroke of 12, and will not finish a piece of work which will take two minutes more to bring to completion, is not the one to become a master-workman. Oftentimes the employer is to blame for the lack of interest among his help and their disposition to demand the exact "pound of flesh." He is unsympathetic, "locks" them for a slight and unavoidable loss of time, and so engenders inharmonious or unfriendly relations. Where there is a mutual good feeling, each party to the contract will be alert to help the other in time of need.

Waste of Power in Friction.

The frequent use of the indicator for determining the amount of power consumed in driving shafting is of great value. From 30 to 50% of the power of engines is ordinarily used for this purpose. The running condition of shafts and bearings, the alignment, the quality of the lubricant, and the tension of the belt, all have an important effect on the amount of power need up in friction. These are every one liable to change.

The difference in the friction of a line of shafting in perfect order, and the same not in perfect order may not be such to attract attention by any outward sign. But the indicator will show a difference, and it is liable to be of considerable amount. The repeated employment of the indicator for this purpose is a simple and certain means for showing changes that may occur, and furnishes a reliable indication as to when this important consumer of power needs attention.

The friction of the shafting and loose pulleys located in a certain new building was found by indicator test to consume 19.34-horse power. At the expiration of 15 months a similar test of the same shafting showed a consumption of 26.64-horse power, being an increase of 35%. As far as those having charge were aware, the bearings and all the conditions were practically the same as before. A test on another engine showed an increase in friction amounting to 44% after the expiration of five months.

The use of the indicator, the determination of the actual performance by tests of boilers and engines, the careful examination of the uses to which steam is applied, not only detect the first source of waste, but locate the place of the second, and point to remedies for both.

EDGE TOOLS.—All cutting and piercing edge tools operate on the principle of the wedge. A brad-awl furnishes an example which all can readily understand. The cutting edge of the awl severs the fibers of wood as the instrument enters, and the particles are compressed into a smaller compass, in the same manner as when a piece of wood is severed by a wedge. A chisel is a wedge in one sense, and an ax, drawing-knife or jack-knife is also a wedge. When a keen-edged razor is made to clip a hair or to remove a man's beard it operates on the principle of the wedge. Every intelligent mechanic understands that when a wedge is dressed out smoothly it may be driven in with much less force than if its surface were left jagged and rough. The same idea holds good with respect to edge tools. If the cutting edge be ground and whet to as fine an edge as may be practicable with a fine gritted whet stone, and if the surface back of the cutting edge be ground smooth and true, and polished neatly, so that one can discern the color of his eye by means of the polished surface, the tool will enter whatever it is to cut by the application of much less force than if the surface were left as rough as they usually are when the tool leaves the grindstone. All edge tools, such as axes, chisels and planes, that are operated with a crushing instead of a drawing stroke, should be polished neatly clear to the cutting edge, to facilitate their entrance into the substance to be cut.—*Manufacturer and Builder*.

SCIENTIFIC PROGRESS.

SUNBEAMS.—The greatest of physical paradoxes is the sunbeam. It is the most potent and versatile force we have, and yet it behaves itself like the gentlest and most accommodating. Nothing can fall more softly and more silently upon the earth than the rays of our great luminary—not even the feathery flakes of snow which thread their way through the atmosphere as if they were too limy to yield to the demands of gravity like grosser things. The most delicate slip of gold leaf, exposed as a target to the sun's shafts, is not stirred to the extent of a hair, though an infant's faintest breath would set it into tremulous motion. The tenderness of human organs—the apple of the eye—though pierced and buffeted each day by thousands of sunbeams, suffers no pain during the process, but rejoices in their sweetness, and blesses the useful light. Yet a few of those rays, insinuating themselves into a mass of iron, like the Britannia tubular bridge, will compel the closely-knit particles to separate, and will move the whole enormous fabric with as much ease as a giant would stir a straw. The play of those beams upon our sheets of water lifts up layer after layer into the atmosphere, and hoists whole rivers from their beds, only to drop them again in snow upon the hills, or in fattening showers upon the plants. Let but the air drink in a little more sunshine at one place than another, and out of it springs the tempest or the hurricane, which desolates a whole region in its lunatic wrath. The marvel is, that a power which is capable of assuming such a diversity of forms, and of producing such stupendous results, should come to us in so gentle, so peaceful and so unpretentious a guise.—*Manufacturer and Builder*.

CURIOUS FACT CONCERNING BOILING WATER.—At a recent Association meeting, Mr. A. J. Haddock, A. I. C., related the following: A kettle filled with boiling water was hung in the hottest room of some Turkish baths, with the lid on. The temperature of the surrounding air was 262° Fahr. After about an hour the temperature of the water was taken, and indicated, as was expected, 212°. The kettle was then rehung with the lid off. The temperature of the room was now 252°. In 20 minutes the temperature of the water had fallen to 185°; in 30 minutes, to 178°; in 45 minutes, to 170°, and was evidently still falling. The manager stated that it generally fell finally to about 140°, when a point of equilibrium seemed to be established, and the water neither got hotter nor cooler. Mr. Haddock supposes this loss of heat was due to rapid vaporization and conversion of the sensible heat of the water into the latent heat of steam, and as dry air is a very bad conductor of heat (one of the worst known), the heat required to convert a portion of the water into steam had to be abstracted from the remainder of the water, thus lowering the temperature. In substantiation of this explanation, we know as a fact that if water is placed in a vessel over a large hunk of strong sulphuric acid, in the receiver of an air pump, and the air is exhausted, the rapid evaporation of one portion of the water will actually cause the rest to freeze.

PURIFICATION OF SULPHURIC ACID BY CRYSTALLIZATION.—In the *Zeitschrift für Analytische Chemie*, Tjeden Moddermann remarks that he has for some time been accustomed to prepare pure sulphuric acid by recrystallization of the hydrate ($\text{H}_2\text{SO}_4 \cdot \text{H}_2\text{O}$), and finds this seldom adopted method of purification to be really an excellent one. The author has experimented in this way upon acid containing considerable quantities of lead and arsenious and nitric acids, etc., and hypocrystallized recrystallization has in all cases obtained a pure acid from them. The method is very simple. The acid is mixed with sufficient water, and, in bottles two-thirds full, exposed to the cold in the open air on a frosty night. If the mixture has been properly made it is generally frozen throughout the next morning. The chief thing then is to carefully separate the crystals from the mother liquor, and for this purpose the author employs a centrifugal apparatus, so constructed that the acid only comes in contact with glass. The separation is very easily effected, and except in cases where an acid is strongly contaminated with the different oxides of nitrogen, one recrystallization is generally sufficient.

SEEING AND SIGNALING.—M. Carpentier tells us that the time elapsing between a person seeing a signal and being able to repeat it with his forefinger is about 13-100 of a second. With some people the interval is twice as long, but the above may be taken as the average. M. Carpentier terms the interval in question the "duration of luminous perception," and he measures it in a very ingenious manner. A black disk is set revolving at a given speed, and the observer faces it, having under his finger an electric key. There is a small opening or window in one part of the disk, and when this comes round opposite the observer he sees a light shining through it. Immediately he presses the key and an electric signal passes to the revolving disk. The disk is stopped, and the distance between the window and the record of the signal being measured furnishes the result. The distance between the two points on the disk is, of course, easily turned into time, since the disk was revolving at a known speed.

SCIENTIFIC SUGGESTIONS.—Prof. Lockyer is of the opinion that there are many facts suggested by the spectra of solar and stellar physics which seem to show that the elements themselves, or, at all events, some of them, are compound bodies. Thus it would appear that the hotter a star the more simple is its spectrum, for the brightest, and therefore probably the hottest stars, such as Sirius, furnish spectra, showing only very thick hydrogen lines, and a very few thin metallic lines, characteristic of elements of low atomic weight. On the other hand, the cooler stars, such as our sun, are shown by their spectra to contain a much larger number of metallic elements than stars such as Sirius, but no non-metallic elements; and again the coolest stars furnish spectra characteristic of compounds of metallic with non-metallic elements. These facts appear to meet with a simple explanation, if it be supposed that, as the temperature increases, the compounds are first broken up into their constituent elements, and that those elements then undergo decomposition into elements of lower atomic weight.

SCIENCE IN JAPAN.—Scientific men in Japan are now discussing the possibility of utilizing the internal heat of the earth. At a recent meeting of the Seismological Society, Mr. Milne read a paper in which he said that the fact that there was an unlimited supply of energy in the interior of the earth had been generally overlooked, although portions of it crop out in countries like Japan, Iceland and New Zealand, in the form of hot springs, solfatara, volcanos, etc. He stated that there is an unlimited supply of water in hot springs within a radius of 100 miles around Tokio, and that the heat of these springs should be converted into an electric current and transmitted to towns and business or manufacturing centers.

METEORIC HAIRSTONES.—At the late meeting of the British Association, Prof. Schwedoff said some startling things about hairstones. He made mention of one hairstone 26 inches in diameter, and of another as large as an elephant which took three days to melt. He advanced novel and startling views on the formation of hairstones. He contended that hail, exhibiting a regular crystalline form, and not infrequently falling from all points of the atmosphere, is not of atmospheric origin, generating from moisture suddenly in aerial storms, but that the stones come from ultra-terrestrial regions, and are, in short, a species of meteor of cosmic origin. Sometimes meteors were an accompaniment of hailstorms.

PROPOSED NEW SCIENTIFIC PHRASES.—Some scientific journals propose that men of science should be called "scientiates," and not "scientists," and that instead of using the phrase "scientific studies," we should rather employ "scientia studia." No doubt these changes would harmonize our expressions very closely with the Italian *scienziati* and *scienziati*, but it is exceedingly questionable whether the adoption of these new words would add much to precision of statement, when the words now in use have very definite meanings attached to them.

OBSTACLES TO THE CULTIVATION OF SCIENCE.—The *Popular Science Monthly* rightly says: "Two unregulated and overwhelming passions in this country stifle the growth of science—the intense and absorbing passion for wealth and the universal infatuation for politics. These are great national diseases, not peculiar to America, but malignant in America, and the state of mind they engender makes the systematic cultivation of scientific thought next to impossible."

SILICIUM INSTEAD OF CARBON.—Mr. Werdermann, whose electrical discoveries have attracted much notice, has just patented a new incandescent lamp. The peculiarity of this lamp consists in the fact that the vacuum, indispensable in all other such lamps, is dispensed with. Mr. Werdermann employs silicium in place of carbon, and he has succeeded in procuring from it better results than if carbon were employed.

COLD OR HOT GAS.—An eminent authority on illuminating gas, Mr. Sagg, insists that one point of great importance in the construction of a gas-burner is that the gas should not be heated until it arrives at the point of ignition. The body of the chamber below that point must therefore be made of a material which is a bad conductor of heat, to prevent an undue expansion of gas and maintain the heat of the flame.

JUPITER'S SPOT.—The great red spot on the planet Jupiter is reported by some observers to be growing fainter, with the prospects of an early disappearance. Others can detect no change. This remarkable object, nearly 30,000 miles in length and more than 8,000 in breadth, which has for more than three years maintained its size and shape without material change while moving across Jupiter's surface, is still a source of much perplexity to astronomers.

"PRESENT evidence," says Prof. Owen, in *Longman's Magazine*, "concurs in concluding that the modes of life and grades of thought of the men who have left evidences of their existence at the earliest periods, hitherto discovered and determined, were such as are now observable in 'savages,' or the human races which are commonly so called."

MASOOTE MINING CLAIM.—The Robinson Co. have purchased the machinery of the Ocala mine, on Squirrel creek, and have contracted with the well-known machinist Zeph Manna to set it up on the Masoote claim, in east Grass Valley, so that it will be known as the old Bulmer lot. It is proposed to give the claim a fair trial, and the appearance of the ledge and the expectation that it will make a valuable mine. Old miners in the district have an opinion that it may prove to be the true western extension of the once famous Eureka mine, for which much prospecting has been done. The new owners are the sons of "Old John Robinson," the well known citizen of Mr. George Murphy, who retains a third interest in the ground, is the superintendent of the mine.

ARIZONA MINE.—*Transcript*, Jan. 6th: The new 10-stamp mill at the Ariz. mine has been running for the last 3 days. The mill was constructed under contract by M. C. Taylor, the Grass Valley countryman, and is a first-class piece of machinery. It is furnished with four Flume concentrators. This mine has had considerable money expended on it in work of a prospective character. The main shaft is 600 ft. deep. At the bottom of the shaft, about 400 ft. below the surface, a small water course has been discovered. At the 400 level the ground has been pretty well prospected, the north drift being in 400 ft. and the south drift 250. On the 300 level the north drift has been run 630 ft. and the south one 300 ft. Three hundred ft. of crosscuts have been run at different points. The general average of the chutes thus far prospected is from 3 to 10 ft. in thickness, and varying in length up to 1,000 ft. At present it is difficult to run a crosscut through the drifts, but after a number of months or so some definite ideas can be formed as to the ore's value. The former owner intended to have had 2 or 3 crushing at cut-mills that paid from \$10.50 to \$33 a ton. The lateness of the season when the wood contracts were let renders the supply of fuel short, and until the weather settles and the roads get fit for hauling the work of development will be somewhat retarded. The property is well recorded here, and is being managed with careful and economical management. It will develop into a first-class mine. It now seems to be in good hands, Supt. James displaying energy and shrewdness coupled with a determination to do his duty. We shall more thoroughly discuss the mine's prospects hereafter.

PLACER.

ANOTHER MINING ENTERPRISE.—*Placer Herald*, Jan. 6: Wm. Werry, one of our thrifty and energetic mining men, has a force of men at work on what is known as the western extension of the Rising Sun mine, near Colfax. He proposes to work the ledge through a tunnel from the Bear River gage. This tunnel is now in about 200 ft., or nearly half the necessary distance. The old Rising Sun has been one of Placer's best paying quartz mines, and Mr. Werry, who was superintendent of the latter, has some time, has concluded that the extension is as good as the original.

THE PART AND FUTURE.—Except the injury to business caused by the hammering of our hydraulic mining industry, the year 1882 was a prosperous year for Placer county. The drift mines generally did well, and the quartz mining industry received quite a stimulus by the development of a number of comparatively new leads. Thus far the outlook for the year 1883 is altogether encouraging, except for our hydraulic miners. They have not yet had water enough to wash, and the threat that comes from below of enjoining them if they attempt to wash, makes their outlook anything but good.

PLUMAS.

NOTES.—*Oreenville Bulletin*, Jan. 3: There is not much of note to report in the mining interest this week. At the Cherokee there have been several sales under the attachments for labor and supplies furnished. The future of the mine and the old Silver Hill mine will be reported here by the current several times of some one coming from New York fully authorized by the directors to settle up the affairs of the mines with a view to resume operations, but no such person has yet appeared.

GREEN MOUNTAIN.—At the Green Mountain mine both the mills are running steadily. Stock papers in New York give very dismal accounts of the mine, but these accounts are very different from what is said of the mine by men who have the very best facilities for knowing its condition. However, it is a struggle between the stockholders and the stockholders; they can fight it out. The new air compressor lately received is nearly ready for work.

SAN BERNARDINO.

GARFIELD.—*Calico Print*, Dec. 30: Owned by Wm. Raymond. Two men at work on the ledge, which runs north and south. Ore assays \$500. Vein matter 7 ft. wide. A shaft 7 ft. in being sunk.

ALTAIR.—Work on this mine still progresses, and tons of first-class ore are being taken out daily. The returns of the last lot of ore taken to Sherman's mill averaged over \$800 per ton. A previous run went from \$400 to \$600; the last run averaged \$10 better than the same kind crushed at Oro Grande mill.

ORIENTAL MILL.—The work on this mill is progressing, and before many weeks it will be in operation. The boiler and engine are in place and the pump is being set in order. All the machinery is on the ground and the heaviest part of the work finished.

SILVER SPRING.—This promising mine has been bought by Messrs. Hunt, Daggett, Walsh and others, the amount paid being \$1,500. The Sherman mill has been leased for a month, and it is the intention of the company to put enough men on the mine to take out 10 or 12 tons a day. Last Christmas there were several men at work on the claim, and the showing continues to be good. There are 230 sacks of good ore on the dump and Mr. Benfield is making arrangements to have the same crushed at Sherman's mill.

BES.—This mine, owned by Wm. Raymond, is showing up well. A cut 14 ft. deep has been run 10 ft. into the ledge, from which ore has been taken assaying \$2,000 and working \$1,000 to the ton. Eight or 10 tons of ore are on the dump.

O. K.—Owned by Robt. Greer and Barrett. Situated near the Bismarck Assessment work is being performed. Ledge 2 ft. wide. Ore assaying \$100.

DEACON, No. 1.—Work has been resumed on this mine. On the northern side a tunnel has been run in 20 ft. On the southern side the shaft is down 20 ft. The paying streak is 10 inches wide, and the ore assays as high as \$1,000 per ton.

SHASTA.

CENTENNIAL MINE.—*Shasta Courier*, Jan. 6: One of the promising mines of western Shasta is the Centennial, owned by Russell & Co. It is located at the extreme head of Eagle creek, and about five miles from the noted Chico mine. The ledge shows a width of 6 ft. on the surface, and 4 ft. at a depth of 10 ft. The ore is principally silver, is almost entirely free from base minerals, and very much resembles the best and freest ore of the celebrated White Pine district in Nevada. The course of the vein is northeast, and it is found at an altitude of 3,500 ft. There has been 100 tons of ore taken out of this ledge, and tests by numerous assays give an average of \$75 per ton. The mine is being developed by several tunnels, the combined length of which is 425 ft. These can be run to a depth of 3,000 ft. below the surface, and without interference from inflowing water, and the facilities for dumping the ore direct from the tunnels to a splendid water-power is unsurpassed.

SIERRA.

SAVAGE PLACER MINE.—*Sierra Tribune*, Jan. 6: On the ridge between Forest City and the Savage mine the snow is now about 3 ft. deep. An effort was made before the mine was shut down to shovel out a trail, but with very little success, as the shovellers were obliged to wear snowshoes. To get 19 bushels of coal in the mine cost \$14, and other supplies in the same proportion. Some of the rock that was thrown out by the last blast in the face of the drift was rotten granite mixed with slate, and quite

soft. This drift is now in a distance of 692 ft. The drift is liable to cut into the second or main channel at any time. Jas. McNaughton, President of the Bald Mountain Co., and H. W. Wallis, Superintendent of the Bald Mountain, have examined the Savage ground, and say that the drift is a gravel drift, and that the gravel is merely an overflow from the main channel. The company is confident that when the main channel is reached paying gravel will be found. Everything at the mine will be kept in good shape until work is resumed in the spring.

TUOLUMNE.

FRUIT MINE.—*Tuolumne Independent*, Jan. 6: Dr. Blatchley, who is superintending and operating the Empire drift gravel mine, in Table Mountain, on Mormon creek, has supplied new track, put the tunnel up at heel, and huzg new the air-pipe to the extreme end, at the gravel channel. Two gangs of men are being worked respectively up and down the channel from the tunnel. The doctor gets \$1 to the pan, and says the chances for a "boom" are decidedly favorable. From the "perfectly marvellous" amount the channel has paid in different claims along the line in early days, we have no doubt that this virgin ground will surprise the owners and be the means of reviving like mining properties in other sections of the county.

NEVADA.

WASHOE DISTRICT.

OHIO.—*Enterprise*, Jan. 6th: The joint Mexican mine is now a few feet below the 3100 level. There has been no change of formation. The ground is not so soft that much better progress can be made in sinking. A sample of sufficient depth can be made in 8 or 10 days if the ground continues as at present. The material in the bottom shows some small feeders of quartz, and is quite favorable for the finding of ore, assays showing it to be fertile and metal-bearing.

MEXICO.—The joint Mexican Consolidated east cross at the 2000 level is showing some favorable ground, more than it has heretofore, and quartz feeders and stringers are beginning to appear in the face. A station is being cut out for a joint drift at the 2000 level. For work in the joint drift, now down below the 3100 level, see report on Ophir.

UNION CO.—The joint Mexican east drift on the 2000 level is passing into the ground which shows feeders and stringers of quartz. On the 2000 level are also cutting down the grade in the main drift. The station from which starts joint Sierra Nevada east drift on the 2000 level is being substantially timbered. All other work is progressing as usual.

UNION SHAFT.—Next Monday the work of taking out the present pumps and putting in those of larger size will be commenced. The present pump column will be allowed to remain, as it will carry all the water that can be raised from the large mine. The pump will be put in place at the shaft to be greatly increased at small expense.

CONSOLIDATED VIRGINIA.—The face of the east drift on the 2700 level is showing promising feeders of quartz. The work of overhauling the machinery is about completed, and the first of next week all the miners of the north end mines will pass down that way, pending the changing of the pumps at the Union shaft.

CALIFORNIA.—Progress is being made in the joint Consolidated Virginia east drift on the 2700 level. The face is in material containing many feeders of quartz. A drift is being run into the core, a drift's ground on the 2000 level. This is an extension of the drift which was run south across the Ophir.

HAIR AND NORCROSS.—The joint Savage north later drift on the 2000 level is being advanced as rapidly as possible toward the Savage south line. The face is in material showing a considerable amount of quartz. Thus far not much water has been encountered.

SIERRA NEVADA.—The east crosscut on the 2700 level is being pushed ahead as rapidly as possible and is going toward its resting ground. The joint Union Consolidated station on the 2000 level, from which starts the joint east crosscut, is being permanently timbered.

CHOLLAR.—The south drift is passing through vein material containing numerous seams of quartz, but of the kind that carries little metal. The drift is passing into a section where it is necessary to guard well against water.

GOLD AND CURRY.—The west crosscut is being advanced at the usual speed. The diamond drill was sent ahead last week to guard against water. The crosscut is going into a promising country lying out west in front of the foot wall.

SAVAGE.—The joint Hair and Norcross north drift, on the 2000 level is in soft ground of a favorable appearance. Some water is encountered, but not sufficient to interfere with the operations of the workmen.

ARIZONA.—The north drift from the winze is in very favorable material, and the east crosscut from the south drift is cutting quartz of a favorable character.

YELLOW JACK.—Are taking out about 60 tons of good milling ore per day from the old upper levels. The mine is now making regular shipments of bullion.

BRISTOL DISTRICT.

DAY MINE.—*Pioche Record*, January 21: In the Day mine is being steadily urged ahead and a full force is employed. The 800 level has been reached, a station cut and a drift started in the direction of the ore chamber, and work of sinking to the 600 level is now going on. The machinery has been overhauled, and the little engine is doing good work, it not being necessary to use any windlasses in attaining this depth. This property grows more valuable as work progresses.

ESMERALDA DISTRICT.

NEW MILL STARTED.—*Esmeralda Herald*, Jan. 6th: The most important event of the week in the vicinity was the starting up of the new mill at Gregory flat. Everything started off as smoothly and nicely as could have been wished for, and all at the noise of the falling stamps the po. Hags of champagne corks were let to burst, and men and boys were overjoyed. The day was a success when all returned to their respective abodes, fully satisfied with the starting up of the new mill, and wishes for it a long and successful run. Rejoice and be glad, for a brighter day has at last dawned upon this benighted people, and the star is once more in the ascendency. A portion of the building of the Silver Hill mill at Bodie was used, and the balance of the lumber was hauled from Hawthorne. The boiler, engine and parts of the Silver Hill mill were also used, while the rest of the machinery was obtained in San Francisco. The main building is 45 ft. wide by 80 ft. in length; battery-house and ore-house 33x43. The foundation of the engine is made of cut granite, and is 22 ft. long by 32 ft. deep and 9 ft. wide. Ten stamps, 4 pans, 2 rollers and 1 separator are now in use, giving a capacity of about 20 tons daily run. Mr. Barton put up the machinery and George Allright had charge of the building. They did their work well and satisfactorily.

CONCENTRATING WORKS.—Supt. McIntosh now has a force of 40 miners at work stopping out ore and prospecting. All of the stops are looking well, and yielding about the same quantity and quality of ore as usual. The inside workings of the mine are now arranged that no waste has to be taken out, it all being stored away. During the past month an ore-house has been erected at the mine, into which the ore is run on a car. Mr. McIntosh now has everything in and about the mine in fine working order, and is desirous of giving the country the best and most systematic and energetic control of the property. Through blivm and energy the Cortex now bids fair to soon become a bullion producer of no small pretensions.

JACKRABBIT DISTRICT.

NEW SHAFT.—*Pioche Record*, January 21: A large double-compartment shaft is being sunk on the Cotton-tail mine in Jackrabbit District, there being two shifts employed in the work. Lynch has commenced working this property in earnest, a thing which should have been done long ago.

PARADISE DISTRICT.

BULLION MINE.—*Virginia Enterprise*, Jan. 6th: J. V. McCurdy who has been superintendent of the Bullion mine and mill, Paradise, for some months past, arrived in this city, where he is family residing, a day before yesterday. Mr. McCurdy thinks well of the Paradise mines,

and will probably return again to flumbolt. The Bullion mine has been shut down for the present, owing to the bad condition of the roads, but there are several hundred tons of ore at the mill, and tailings sufficient to run it for some time. Mr. McCurdy says that in no instance, thus far, has any vein in that district disappointed its owners when they have expended a cent and labor in sufficient and intelligent prospecting operation.

THE LIVE YANKEE.—*Silver State*, January 4th: Nick Frayer is in town from the Paradise mines. He says they have struck the ledge in the Live Yankee tunnel at a depth of 325 ft. The vein is large, but the greater part of the ore is of a low grade, averaging about \$10 to the ton. There is a small streak of the ore which assays over \$3,000 to the ton, and the indications are that it will increase in size as the vein is opened. Mr. Frayer deserves success, and we sincerely hope he will attain it.

TUSCARORA DISTRICT.

BLACK LICK.—*Times Review*, January 4th: North drift, west vein, 350 level, extended 24 ft. Formation continues favorable for making rapid progress.

INDEPENDENCE.—Drift south on the 400 level has been extended 9 ft., total length, 241 ft. West cross-cut advanced 7 ft. No. 1 shaft has been completed to the depth of 200 ft.

NORTH BELLE FLS.—Since last report no work has been done on the mine, but the machinery is about completed, also the work on the boiler. Sinking of the shaft will be resumed in a few days, which will be continued to the depth of 400 ft.

ELKO CO.—During the past week the main drift at shaft No. 1 has been extended a distance of 8 ft. The formation continues hard. The ledge continues to widen and the ore improves in quality. Arrangements for sinking a new perpendicular shaft will soon be completed and better results obtained.

NAVADO.—South drift, east lateral vein, 350 level, has been extended 15 ft. It shows a large width of vein matter and small seams of rich ore. Crosscut on the 450 level has been extended 13 ft. Stopes are looking well. Drift on shipment of \$16,100.98 was made on regular shipping day, and for the month ending Dec. 31, \$85,194.83.

GRAND PRIZE AND ARIZONA.—East drift on 700 level extended 24 ft. total, 294 ft.; west drift, 17 ft.; total, 53 ft. North crosscut on 150 level, 15 ft. total, 35 ft. Ariz. vein 9 ft. total, 72 ft. in depth. Joint vein, 17 ft. total, 123 ft., following the inclination of the ledge. No change of formation in any part of mine, except an improvement in joint winze. Have taken out one of the steam pumps, and will have the plunger pump in and running all right by the last of the week, which will save a large amount of fuel and several men's wages.

TYBO DISTRICT.

BULLION.—*Bulmont Courier*, Jan. 6th: The Tybo mill is still running on ore from the 2 G mine. Considerable bullion was shipped during the past year from that camp.

WARD DISTRICT.

LIVELY.—*Pioche Record*, January 21: Ward is getting to be quite a lively place, and there are a good number of people there and the vacant buildings are rapidly being inhabited. Work of placing the mill in order is going on, but Mr. Poujade says it will not be in readiness to start up for several weeks yet.

ARIZONA.

BIRNEY.—*Cor. Epitaph*, Jan. 4: The history of the past year shows a great deal of material improvement, a great deal accomplished fact that was a year ago contemplated, and a confidence in the future, if ever in any degree impaired, restored and greatly augmented. The Copper Queen, then a giddy young thing that people feared had no depth to her, has settled down to business, been a regular producer ever since, and demonstrates her right to the supremacy she has won. This mine is probably the best developed silver property in the Territory to-day, with every probability of continuing to be so for years to come. She may not pay such large dividends as some, but that is only because a greater force from her present development a prodigious amount of copper per month if her owners chose. But they are well satisfied with the present excellent, judicious and economical management of their property. The Silver Bear, about a mile and a half from the Queen, is also a fine mine. For several months she has been producing rich ore. It is said that all the expenses of working the mine have been paid from the ore extracted, and this ore had to be hauled a distance of miles for reduction. The Queen considered the best, although until now lying undeveloped. Besides these the Black Jack, the Holbrook, Cave, Ulio Sam, Della Mack, White Tailed Deer, and a score of others show enough in prospects to encourage the belief that there will one day be the greatest mining camp in Arizona. Our population has not greatly increased, but there are indications that those who are here have come to stay. The tents have given way to commodious houses and cabins.

WASHINGTON.—*Idaho News*, Jan. 2: The shaft of this mine is about 700 ft. due north of the Silver King mine, and is down 45 ft. on a ledge dipping 45° towards the Silver King mine, on pay ore all the way down from the grass roots, very much resembling the Silver King ore as that was ore and the best of the kind. The ore is all along the surface the entire length of the claim, which runs northeast and southwest, and over on to the ad. being claim on both sides. The vein is narrow, averaging about 4 inches, but very rich. Wages and expenses can be taken out at once. The character of the ore is of the best, clear and galea.

THE THEODORE.—The shaft work on this mine has just been completed. It is about a mile north of the Silver King mine, on the Ir. leading to the Mount View, and is situated between the two main veins, which are 6 ft. apart. The shaft is about 700 ft. deep, and the ore is all along the surface. Some fine quartz and promising ledge matter were taken from the mine. There is a splendid prospect for a big mine on this claim, as several veins cross it, which it is the intention of the owner to sink out when they shall have attained sufficient depth in the perpendicular shaft which they are now sinking.

OWL HEAD DISTRICT.—The Jesse Benton mill is running on ore from the Desert mine, ledge 10 ft. wide, yielding large quantities of bullion. The mill is owned by W. H. Merrill, working mine and mill with economy and good judgment. They are getting very rich ore in the Jesse Benton, but it is rebellious, and they let it till they can adopt a better process for working it. The mill is doing well, the Chit mine, sinking an incline shaft, showing good ore.

COLORADO.

THE INDEPENDENCE.—*Colorado Miner*, Jan. 6: J. P. Williams, of Denver, largely interested in the mine claims here and around Deatur, came up from Denver last Friday night to take charge of the Independence mine on McElhann mountain. It is proposed to open up the property, which already has made a record for producing large supplies of good ore, in thorough, systematic manner. Mr. Williams is a miner of long and varied experience, having been engaged in the business for 28 years in Australia, New Zealand and America.

OVER THE RANGE.—Mr. Joseph A. Love returned from a trip over the range on Tuesday last, where he has been doing Chace work on some of his mining property, and says of that section and the roads: There has never been so little snow in the range at this time of the year as at present. From the Horse Shoe to Montezuma the snow will not average a foot in depth. The weather is quite pleasant, and outdoor work has been pursued all winter. A few people are working in the Snake River valley, who are working the mines. The Horse Shoe Mining Co. are employing a number of men, as also are the owners of the Captain Jack. Large quantities of ore are being taken from the latter. Nine men are employed in the Deatur mine, mostly on the ground work. They have 150 tons of first-class ore, and several hundred tons of concentrating ore. The new mill at Deatur is employing 18 mechanics in putting in machinery, and the company expect to start up work about the 1st of April. All the people who are living there are contented and satisfied with their future prospects. At Montezuma a large number of men are engaged in working the mines, and are shipping about 50 tons of ore per week to the South Fork railroad for transportation. The Leadville, which costs \$100,000 for transportation, carrying freight and passengers. Between 100 and 200 men are working between Haywood's and the forks of the Snake river. The road is surveyed and located to Montezuma. It is expected that cars will reach that point early next summer.

IDAHO.

WOOD RIVER.—*Cor. Idaho Statesman*, Jan. 6th: Our people cannot tell when the snowfall commences, when it will end, and consequently when we will have a snowfall of 11 inches during the early part of October. All the teams that were engaged in hauling ore, wood and lime to our smelters, became alarmed, and left-making it necessary to close down. Soon after the teams left, the weather became warm, and has remained so ever since. The snow is now about 10 inches deep, which shows the work of the Kellogg smelter for a given time, with the loss of last week it closed, and you can see how much we are loser. Here are the figures, which are official: The Philadelphia Co., at Ketchum, operated ore, 40 tons furnace, about 3 months during the past season, and at that time put through 4,250,350 lbs. of which yielded 1,575,257 lbs. of lead and 165,879 ozs. of silver. Of this amount, 1,493,913 lbs. giving a yield of 510,165 lbs. of lead and 47,228 ozs. of silver, were from mines operated by this company. They purchased outside ore to the amount of 1,420 tons, which yielded 1,685,992 lbs. of lead and 118,183 ozs. of silver. Thus you will see that the teams remained on the work gone on without interruption, for 3 months, and we would have had an additional output of at least \$50,000, and one-half of which would have been expended here for team hire and labor. It can be readily seen what a difference this would have made in the circulating medium of this country, and this is one of the many interests which have suffered by that storm. It is no wonder that 100,000 would not more than make this country even on the damage sustained. But we are doing the very best we can under the circumstances. It will not do for a mining community to let go, and "cry over spilled milk." Every one seems to be doing the very best he can to amend the misfortune. Mines are being opened, ore taken out and piled on the dump; assessment work is being done, and preparation for the spring. All seem to be of the opinion that the summer of 1883 will be one of great prosperity in this country.

MONTANA.

STIRKE IN THE SHONBAR.—*Inter-Mountain*, Jan. 5th: During the past few days Joseph La Calf, Judge Warren, Judge Barrett and other owners in the Shonbar, have been highly elated over developments in that rising property. At a depth of 85 ft a drift was started east on what was supposed to be the main ledge, which it followed for a distance of 125 ft. At this point one of an entirely different character was struck in a vein trending northward, and of which what is thought the old ledge is merely a spur. The ledge is yet unknown in width, but the ore body measures 31 ft wide and samples 107 ozs in silver and 2 ozs in gold, giving the ore a total valuation of \$150. A 3 ft body of \$150 is a big bonanza in any country. La Calf is quite certain that he has hit all along in working the ledge, and that the vein is just discovered in the 150 ft east drift will develop into a veritable bonanza.

A NEW BONANZA.—*Helena Independent*, Jan. 6th: Several weeks ago Dr. F. Remington, of Lincoln, Deer Lodge county, gave Mr. C. E. Kemp two samples of ore to be assayed. The ores assayed in gold and silver about \$1,720, and \$1,330 per ton. From a letter received yesterday by Mr. Kemp from Dr. Remington, in relation to the mine from which the samples were taken, we make the following extract: "The mine from which sample No. 1 was taken, is located in the mountains, and I cannot possibly get any more ore for a larger test sample until spring. I had some more ore, but it was lost when our house burned down."

NEW MEXICO.

TELEGRAPH DISTRICT.—*Silver City Enterprise*: The people of the Telegraph district are talking of building a road from their camp to Rich's ranch, on the Lordburg road. Almost every miner in the district has agreed to do a certain amount of work on the road or to have some one to do it in his place, and the Lordburg merchants are taking of subscribing money to aid them in the enterprise. This step is being taken because there is no road leading to the mine at present, and goods taken there from Silver City or from Lordsburg are very expensive. The road will be packed on burros for about two miles. Lordsburg is at present the nearest point on a railroad to Dursey's camp, but when the Silver City, Deming and Pacific Railroad is completed, this station will be at least 20 miles nearer. This district is an exceedingly rich one, and the population will probably increase rapidly.

OREGON.

NOTES.—*Jacksonville Times*, Jan. 6: Berryman & Hansen, of Applegate, continue drifting to good advantage, in spite of the cold weather. S. A. Borough, of Sale Creek, showed us some specimens of iron ore found in that section. The weather is more favorable for mining, and it is said as the cold spell seems to be broken, and some snow and rain have fallen in the past day. The cold snap has put a stop to mining operations, but it is not likely to last long. More work is needed to facilitate drainage in this line, however. R. W. Derickson came over from Horseshoe, Josephine county, this week, and reports that considerable gold is being taken out right along. The miners of Josephine county have been favored with much more rain than the others, besides, the weather has been so cold there, and many are busy at work already. Geo. Ross, who was up from Blackwell this week, informs us that Welch & Co's mill has been put in excellent running order, and will soon be crushing ore at a high rate of activity. Hanna has been in Josephine county locating iron mines for himself and others. He returned Thursday, accompanied by Sam Bowden, bringing some fine specimens of ore with him. Geo. Simmons' mammoth ditch has been completed by him. The mine is to be high for several days this season, operations will be suspended for the present. Mr. S. expects to have this mine in full blast next winter.

UTAH.

NOTES.—*Salt Lake Tribune*, Jan. 7th: Yesterday the Sampson mine at Park City struck in the Van Frazer incline a solid body of rich ore over 2 ft wide, assaying up to \$1,000 per ton. The mine is located southeast from the Crescent group. The Utah Central carried 102 1/2 tons of salt to Ogden during the year 1882 for shipment to Park City, Colorado, Montana, etc. During 1882 there was received at Ogden by the Utah Central from the south, 1,969,767 lbs. of 50,482,633 lbs. base bullion, 7,140,26 lbs. lead and 881,329 lbs. copper matte. The formation of new corporations and sale of property. Numerous valuable claims in Utah and Idaho are now being negotiated for, and we expect to see a big boom in mining matters soon. The Germania lead works will begin the manufacture of white lead in a few days, the machinery and works being almost completed. Miners feel greatly encouraged over the minor output in Utah. The steady increase in the bullion production gives them new courage.

CHAPARRAL PULVERIZER.—There is for sale in this city, as will be seen by our advertising columns, a second-hand Rutherford pulverizer, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it.

IDAHO AND MONTANA mine owners are preparing specimens for the Amsterdam Exposition.

TELEGRAMS announce that the furnace of the Pinal Consolidated mine, in Arizona, has again been started.

COPPER QUEEN produced 2,107,130 pounds copper during the three months ending November 30th, the value of which is estimated at \$400,000.

The Denver Exposition—No. 22.

[Editorial Correspondence.]

Arizona.

West of New Mexico, and occupying an immense region of country extending from the western flanks of the Rocky mountains to the eastern foothills of the southern point of the Sierra Nevada, is the Territory of Arizona. It embraces the southern rim of the Great Salt Lake basin, through which, in the northeastern portion of the Territory, the Colorado river has cut out its famous "Big Canyon," plowing its way down through the high table-land of that region, in many places from three to six thousand feet deep.

The Physical Features of the Territory

Are quite unlike any heretofore described in these letters. It has no great mountain range extending through its Territory or flanking either of its sides. It consists of an elevated plateau, gradually sloping in a southwesterly direction from an altitude of 7,000 ft. in its northeastern corner to that of only 100 ft. at Yuma, near the mouth of the Colorado, in the southwestern corner of the Territory. Isolated and parallel mountain ranges of inconsiderable altitude above their basis extend over this plateau in a northerly and southerly direction. The main ranges through the central portions of the Territory are composed of granite, porphyry and slates. The most important mountain range is the San Francisco, which is dominated by a great volcanic cone, 12,500 ft. high, in the northwestern portion of the Territory, and from which mountain spears of volcanic origin or plutonic upthrow diverge in various directions. Many narrow valleys, and now and then quite wide and open plains, occur between these mountain ranges. Here valleys are, many of them, rich and well watered and covered with an abundance of numerous grasses, and some of them highly cultivated.

Its Early History.

Hundreds of years ago, even before the Pilgrims landed at Plymouth, the early Spanish adventurers pushed their way into this region and found these valleys and plains the happy home of a quiet, industrious and semi-civilized people who tilled the soil, and to some extent worked the mines for gold, silver and copper. The Spanish thirst for conquest and gold destroyed those homes and scattered those people until merely a degenerated remnant was left. After a Rip Van Winkle sleep of some two centuries, the inhabitants of this region have again been disturbed by the appearance among them of a new but more progressive and utilitarian people, bringing with them the same old thirst for gold indeed, but with it, instead of the weapons of war and pillage, they bear the implements of peace, at least to all who seek and love peace and progress. The industrious Pima is protected in his rights of person and property, while the Ishmaelistic Apache, whose hand has ever been against every other man's hand, is justly hunted down without mercy.

The very name of "Arizona" has, perhaps by association, become suggestive of golden nuggets, streams yellow with golden sands and mountains rich in precious minerals. The origin of the name and its signification are somewhat doubtful. Some say the word signifies "The blessed Sun," from two Indian words, which, in the Mohave dialect, are *ara*—blessed, and *Zuma*—sun. Others derive the name from two Pima words—*air*, a maiden, and *zon*, a valley, in reference to a traditional maiden queen who once ruled over all the branches of the Pima race.

Arizona was set off from New Mexico in 1863, and the name first adopted was "Pimieria," which was soon dropped for the more euphonic and appropriate one which it now bears, and which was originally and still continues to be borne by a mountain near the southern line of the Territory. The history of this region has been a series of fierce struggles with the savage Apache. The intrepidity, daring and self-sacrifice of the early Territorial pioneers, who won this rich domain, foot by foot, from the savage race which dominated it at the time of their coming, is yet to be written, and when presented to the world will form one of the bloodiest pages in the whole history of American frontier life.

The earliest mention of this region in history is connected with stories of the unbounded wealth which it was even then supposed to contain. Probably the first European who ever set foot within the present limits of Arizona were the four men whom the Spanish navigator, Narvaez, left on the then unexplored coast of Florida in 1538. These men sought, by an overland journey across the continent, to join their fellow countrymen, who were established at Culiacan, in Sinaloa, Mexico. This remarkable journey was safely accomplished, their wonderful adventures told, and the riches of the country, and especially of the "seven cities of Cibola," portrayed in such glowing colors that an expedition was immediately sent out to visit them in force. This expedition was not unlike that of the ancient Argonauts who went in search of the "Golden Fleece." If the leader, Coronado, failed to bring back the rich treasure of which he went in search, he at least discovered and made known to his countrymen a land abounding in the precious metals, from which they afterwards reaped untold wealth. The old shafts and tunnels which have been discovered in various parts of the Territory give ample

proof that the early Spanish adventurers had fully proven the richness of its mines, and had, in their crude way, worked them largely and successfully. The same evidence exists that a still earlier race of miners once delved for the precious metals in this region; but neither Tolttec nor Spaniard were able to fully appreciate the riches and blessings of this wonderful land, which, almost in their entirety, remained hidden in the mountain fastnesses, until, in the progress of events, they are now being brought to light and usefulness by a race which can fully appreciate their value, and which is developing and dispensing them, not for personal, kingly or priestly hoarding, but for the general good of humanity and the world, and for the building up of another great, prosperous and powerful State in the American Union of States. Arizona is indeed

A Land of Marvels

For either the prospector, the scientist or the eight-seeker. Nowhere on the globe, unless we except the Black Hills of Dakota, heretofore described, can the operations of nature in building up the earth's crust be more clearly traced and described. While the upthrust of the Black Hills has laid open for our inspection and study the book of nature almost to its bottom page, here the stupendous gorges and deep and murky canyons of the Colorado have been so excavated, and to such a depth, that the geologist and mineralogist has only to enter and read upon the broad and massive leaves of nature the records of countless ages which have been impressed upon them in a language and with signs which no man need misinterpret or fail to understand.

The Territory of Arizona is one vast mineral field. In no other State or Territory is there such a universal and extensive distribution of all the minerals which enter into the commercial operations of the world. Every county in the Territory, save possibly one—Apache—a name significant of utter worthlessness and abhorrence—whether the fact is due to the name, to the feared presence of the savage whose name it bears, or to its own rough and rugged topography, we know not, but we are credibly informed that less prospecting has been done in Apache than in any other county in the Territory, and that, too, notwithstanding its indications of mineral value are by no means unpromising. Nature seems to have been especially lavish here in scattering her treasures, and has neglected no portion of this wonderful land, or favored one part above another.

No portion of the Rocky mountains or Pacific mining regions have yielded any greater variety or richer ores. Arizona has produced the largest nugget of native silver ever found upon any portion of the globe—a mass of pure silver weighing 2,700 pounds, which was confiscated by Philip V. of Spain and taken to Madrid. This act was soon followed by the absolute confiscation of the mine itself. It is not uncommon to find silver ores in Arizona which run up to thousands of dollars.

Arizona's Display of Ores at Denver.

In richness and variety, had no superior at that great show of minerals. The *Republican*, of that city, spoke of it as follows: "Considering the recent opening of the Territory, and the bonanza mines, Arizona takes a high rank among the mineral regions of the West, and gives promise of rivaling Colorado in its bullion production when the country is as extensively developed." It includes as large a variety of minerals, and combines the useful with the beautiful in a greater degree, perhaps, than any other exhibit at the Exposition.

The exhibit, besides being exceptionally good, was scientifically arranged, the different variety of ores from the various mines being carefully classified in separate cases, and so placed as to permit of ready inspection. There was no special effort made for mere display. The exhibit comprised specimens from over 400 different properties, from almost all parts of the Territory, whose combined weight was eight tons. The most notable special display was probably that from the Silver King mine. Some of the oxidized copper ores from that and other mines were undoubtedly the finest ever seen. The Tombstone district also made a most notable display. But we have no room for special notice of the various exhibits. One word, however, is due to Prof. J. A. Church and T. R. Sorin, the Commissioners representing the Territory, and for the industry, intelligence and ability displayed by them in the discharge of their duties. No men could have acted more intelligently or filled their places more efficiently. Their attention to visitors was untiring.

Cochise County

Has perhaps become more famous than any other county in the Territory, chiefly from the most remarkable development made within the past two or three years in the district.

Tombstone District.

The region of country comprised in this district has a history quite as dark and gloomy in character as the name which it bears. This region was the chosen retreat of the famous Cochise and his bloody band of warriors, and it is marked all over with the graves of his white victims. The first mining location here was the "Old Bronco Mine," known to be rich long before "Tombstone" had a name, and from which it is distant about six miles. Within the "dark and bloody ground" about this mine it is said no less than sixteen white men have met their death at the hand of savage Indians.

When in the fall of 1877 Mr. A. E. Sheifelen, the discoverer of this district, made frequent trips from Camp Huachuca alone into this neighborhood he was repeatedly told that if he continued his prospecting there he would find a tombstone instead of a mine of wealth; but he still persisted in his hazardous wanderings, and when, in time, he succeeded in finding what he sought, he perpetrated the grim joke of his friends by insisting that both the district and town should be named "Tombstone." The wonderful richness and extent of the district soon spread far and wide and attracted thither a large population, so that within three years from the discovery the town numbered fully 7,000 souls, and the district is one of the richest and most prosperous on all the Pacific slope.

The mineral belt of Tombstone embraces a region of about eight miles east and west by five north and south. The geological formation is porphyry, capped at most of the leading mining camps with lime. The ores of the district are rich and easily worked.

The present output of bullion in the district is about \$600,000 per month, from 140 stamps. This output is continually on the increase as these mines are more fully developed. This is certainly a good showing for a three-year-old camp. Some of the mines have been opened to a depth of something over 500 feet, at which point but very little water is found. There are over 3,000 locations in the district. The ores are mostly free milling silver ore.

This district was well represented in the Exposition by a large amount and great variety of its characteristic ore and rock. The ores are so rich that in several of the mines nearly one-half of the entire yield is disbursed as dividends. The reports of the aggregate yield of the Tombstone district almost challenge belief. The dividends alone from 54 mines for 1881 amounted to \$2,290,000. The dividends from only 43 mines in 1882, all the official reports we have before us, amounted to \$2,087,500. It is said that all the mines from which the above amount was realized were at one time bonded to well-known capitalists of this city for \$90,000, and that the bond was allowed to lapse. However that may be, the mines are now in the hands of good managers, who are working them under a conservative system, with good bodies of ore constantly opened up in advance; and it is predicted that ere five years have passed Tombstone will have developed mines sufficient to more than double her present population. We shall refer to other localities in our next.

W. B. EWER.

THE EUREKA CON. LAVA BEDS.—Concerning these beds the *Ruby Hill Mining News* publishes the following: Perhaps the most remarkable place in connection with our mining industry is the old Wintelz works, which is a part of the Eureka Con. mine, and which is commonly known as the "lava beds." A little over three years ago some miners conceived the idea that ore did exist in these old workings. The place had been abandoned by the company for a period of over two years. These men, having secured permission, commenced operations on the tribute system, and were highly successful. They were followed by others, until at one time there were nearly 30 men working there, all of whom made good wages, while not a few made nice little stakes of several thousand dollars, with which they left the camp for a more congenial clime, and are now living on the fruits of their labor and luck. At present 24 tributaries are working at this place, and we believe that \$4 per day has been averaged by these men. During the time that this place has been worked by tribute nearly a quarter of a million of dollars has been extracted from this once abandoned place, and it looks good now.

BAD MANAGEMENT.—The Investigating Committee—M. J. McDonald, R. H. Rodgers, Marcus R. Hall and Coll Deane—of the San Francisco Stock and Exchange Board filed a report, in which it states: Relative to the Ballion Mining Company the committee says: "We find no work has been done on the mine for about 10 months, and it is now in charge of a watchman. We consider the management of the mine recklessly extravagant and characterized by a total disregard of the rights of stockholders. The Belcher and Crown Point mines have produced, in about 20 months, 96,611 tons of ore, of the value of which we have no certain knowledge, for which the company received \$50.25 per ton, and these mines are still producing about 5,000 tons per month. We do not hesitate to say that these two mines are managed badly, and with a total disregard of the rights of the stockholders. And we further add that we consider the proxy system one of the greatest evils in the business, thereby enabling people to control mines and run them in their own interest who do not own the stock."

QUICK DRIFTING.—The Prussians have discovered that the best way to make rapid advance in drifting in mines is to pay each gang of men separately for the work done, the gangway being measured at the end of each shift. This involves considerable trouble, but results in rapid work. At the Anzen coal mine, in a bed dipping 8° to 10° and 4 ft. thick, a gangway 3 ft. wide was driven 203.5 yards in 26 working days, or nearly 8 yards a day. The work was divided in four shifts, three miners and one trammer in each shift, or 16 men in all. These men also laid track and put in the few timbers required. The work was done on the system referred to.

HOW WOOD IS HOISTED OUT OF THE CARSON RIVER.—The *Lyon County Times* gives the following account of a Nevada invention for hoisting floating wood out of the water: The Carson wood drive is being rapidly taken out of the water. Some distance above the boom wagons are at work, and the hoisting machine at the boom is doing good work. Mr. Cameron intends, in the course of time, to arrive pretty nearly at perfection with his invention. Each time the machine comes here it has improvements added which give it greater efficiency. When first made the wood was carried up the endless chain and thrown over into a cart, and when one cart was full work had to stop until another took its place. A movable apron, or slide, has been added, which extends to a framework across the road, where the first cart stands. The apron is hinged on to the frame and held up while the cart is being filled, and then dropped to receive the wood which slides over it to another cart stationed outside the frame. While the outside cart is receiving its load another takes its position on the inner track, and at the proper time the apron is lifted and the wood again falls directly from the end of the elevator. In this way a continuous procession of cord wood moves out of the river over the endless chain, and no stoppage is required except to repair breakages or oil machinery. It is an excellent contrivance for the purpose, but is especially valuable in cold weather, as it saves the necessity of half a dozen men standing in the water up to their waists for hours while loading wood on the wagon.

HOW MUCH DOES YOUR CISTERN HOLD?—

It is a difficult matter for the average man, who does not make mathematics a specialty, to compute the capacity of a cistern. For the benefit of those who may want to make such estimates we give the following by W. H. White in the *Country Gentleman*: Knowing the capacity of a gallon in ft. and inches, it is an easy matter to calculate the capacity of any sized cistern. A cubic foot of water is seven and one-half gallons. Knowing the cubic ft. in any cistern, by multiplying that by 7½, we find the capacity in gallons. The number of cubic ft. in any rectangular cistern is found by multiplying the length, breadth and height together; the product multiplied by 7½, as above, gives the capacity in gallons. For a round cistern I give the following table as convenient for reference: A cistern 5 ft. in diameter contains 19 3-5 cubic ft., or 147 gallons for each foot in depth; 6 ft. across, 28½ cubic ft., or 212 gallons; 7 ft. across, 38½ cubic ft., or 288 gallons; 8 ft. across, 50½ cubic ft., or 376 gallons; 9 ft. across, 63½ cubic ft., or 476 gallons; 10 ft. across, 78½ cubic ft., or 589 gallons; 11 ft. across, 95 cubic ft., or 712 gallons; 12 ft. across, 113 cubic ft., or 847 gallons. From this may be easily calculated the diameter and depth of a cistern to hold any quantity of water desired.

A GOOD razor paste is made by mixing fine emery intimately with fat and wax until the proper consistency is obtained in the paste, and then rub it well into the leather strap. Prepare the emery by pounding the rather coarse material in a mortar, throwing the material into a vessel of water and stirring well. Immediately after the large particles have sunk pour off the supernatant fluid into an evaporating dish and evaporate off the water. Another recipe is: Emery, reduced to an impalpable powder, two parts; spermaceti ointment, one part; mix together and rub it over the strap. Another is: Jewelers' rouge, blacklead and suet, equal parts; mix and rub it over the strap.

UNPLEASANT TASTE FROM WOODEN VESSELS.—It is often found desirable to remove the unpleasant taste which is frequently observable from new wooden vessels. This is often a thing difficult of accomplishment. An exchange suggests that the simplest plan, and one that will succeed in most cases, is to scald them thoroughly several times with boiling water; then dissolve some pearlash or soda in luke-warm water, adding a little lime to it, and wash the inside of vessels well with the solution. Afterwards scald them again thoroughly several times with boiling water as before.

SECRETARY TELLER has amended the placer mining claim circular of Sept. 22d so that it provides that no application by an association of persons for a patent to a placer claim will be allowed to embrace more than 160 acres, and not less than \$500 worth of work must be shown to have been expended thereon. If an individual becomes the purchaser and possessor of several separate claims of 20 acres each or less, he may include in his application for a patent any number of such claims contingent to each other, not exceeding 160 acres.

ELECTRICITY IN BELTS.—Some of the larger belts in an extensive Western flour mill have been provided with wires to receive and conduct away any surplus electricity that may be generated. Where the belt passes through the floor a wooden cleat is nailed across the opening on the outer side of the floor, an inch or two away from the belt, and to the cleat, pointing out toward the belt, are fastened prolonged hrads, which take the electricity from the belt, the latter being conducted away to water mains by means of wire connected.

The Tariff on Lead.

(CONTINUED FROM PAGE 18.)

higher-grade silver ores, which would be produced after the reduction of the tariff, making a total loss to the laborer, the furnisher of supplies, the mine owner and the smelter of this camp of about two million eight hundred and forty thousand dollars (\$2,840,000) per annum.

This threatened loss is based only on the present output of this camp. The concentration of ores, which is just now receiving the attention of capitalists, and can be carried on successfully with the present tariff, must be abandoned in case of a reduction of the tariff. There is enough of this ore now on the dumps on the various mines, and known to exist, to assure an output of at least 500 tons per day. The profit on these concentrates would be small and would not exceed a fair per centage on the capital invested, but their production would add about \$2,500 per day, or \$750,000 per annum, to the amount expended in this camp for labor and supplies. The profit from these concentrates is estimated at \$200,000. These two sums, added to the sum above given as the threatened loss, show an annual loss of \$3,790,000 to this camp alone, which would fall on the several classes as follows: Laborers, \$2,150,000; furnishers of supplies, \$750,000; and capitalists \$89,000.

To this extent the immediate consequence of the proposed reduction of the tariff on this camp can be traced in figures. Some of the remoter consequences, which will prove none the less disastrous, though they cannot be stated in figures even approximately correct, are the following:

The amount of

High-Grade Ores Produced

Has been and is steadily diminishing. The known bodies of ore that cannot be mined with the reduced tariff already exceed in amount and value the known bodies of high-grade ore. The most reliable mines to-day are the low-grade mines. Hence, the injury resulting from the proposed reduction of the tariff would steadily increase.

Large bodies of low-grade ores that are now penetrated in search for better ores, because the ores taken out in prospecting will pay the expense of the prospecting, will be abandoned if the tariff is reduced, whereby the chances of finding richer ores will be greatly diminished.

Of the 90,000 tons of ore above mentioned as ore that would not be mined in case the tariff is reduced, 60,000 tons are from mines that carry no high-grade ores and would have to shut down. The value of these mines and of the extensive improvements connected therewith would be wholly destroyed. The shrinkage of value in mining property in this camp will exceed the sum of \$5,000,000. Smelters will be similarly affected.

A decreased demand for labor will not reduce wages. The superfluous labor will leave the camp. A decreased demand for supplies will tend to advance their price. Railroad freights will advance if the bulk of the freight is diminished.

The Producer will Suffer by the Reduction. The consumer will gain little, because the reduction is not sufficient to materially affect retail prices. The only real gainers will be the owners of the Spanish lead mines and the foreign shippers.

A reduced tariff will admit foreign lead. The foreign producer would thereupon agitate further reductions of the tariff, and thereby keep the lead market in a state of fever that would check, and eventually destroy, home production. Note the decline of lead produced by the present agitation.

The reduction of the tariff on lead ores by one-half cent per pound, or \$10 a ton, would be even more disastrous than the proposed reduction of the tariff on manufactured and pig lead. The abolition of the tariff on lead and lead ore would be ruinous to the interests of this camp.

The undersigned, though they cannot speak in figures for other camps in this State, know that the proposed reduction of the tariff on lead and lead ore would affect every section of this State, more or less, in the same manner, and must operate as a material check upon the development of the resources of this State, and a blow to the present prosperity of its inhabitants. It is believed that no member of the Tariff Commission, owing to the limited time allotted the Commission for the completion of its labors, was enabled to come here and examine the conditions of our lead industry.

Wherefore the undersigned, on behalf of themselves and of the residents of this camp, respectfully, but earnestly, protest against any reduction of the present tariff on lead and silver ore, pig lead and manufactured lead. [Then follow the signatures.—EDS. PRESS.]

A NEW DYE.—The young growth of the poplar tree yields a dye, to which we have before referred, which may be extracted as follows: The young twigs and branches are bruised and boiled for twenty minutes with a solution of alum, 10 pounds of wood requiring 1 pound of alum, in 3 gallons of water. The solution is filtered hot and allowed to cool, and, after standing some time, is again filtered from a resinous deposit. On exposure to air and light it develops a rich gold color, and may be used directly for dyeing orange and yellow shades upon all classes of goods.

USEFUL INFORMATION.

How to Judge of Good Grinding.

Catch your hand full of the meal as it falls from the stones, and feel it lightly between your fingers and thumb, and if it feels smooth and will not stick much to the hand, it shows it to be fine enough and the stones to be sharp. If there be no lumps to be felt larger than the rest, but all of one fineness, it shows the stones to be well faced, and the furrows to have not too much draught, as none has escaped unground. But if the meal feels very smooth and oily and sticks much to the hand, it shows it to be too low ground, hard pressed and the stones dull. But if it feels part oily and part coarse and lumpy, and will stick much to the hand, it shows the stones have too much feed, or are dull and badly faced, or have some furrows that have too much draught, or are too deep, or perhaps too steep at the back edge, as part has escaped unground and part too much pressed and low. Catch your hand full, and, holding the palm up, shut it briskly; if the greatest quantity of the meal fly out and escape between your fingers, it shows it to be in a fine and lively state, the stones sharp, the bran thin, and will bolt well; but the greater the quantity that stays in the hand, the more it shows the reverse. Catch a handful of meal in a sieve and sift the meal clean out of the bran; then feel it, and if it feels soft and springy or elastic, and also feels thin, with but little sticking inside of the bran, and no pieces found much thicker than the rest, it will show the stones to be sharp and the grinding well done. But if it is broad and stiff, and the inside white, it is a sure sign that the stones are dull or overfed. If you find some parts that are much thicker and harder than the rest, such as almost half or quarter grains, it shows that there are some furrows that have too much draught, or are too deep or steep at the back edge, else that you are grinding with less feed than the depth of the furrows and velocity of the stone will bear.

Efflorescence on Brick Walls.

The Philadelphia Times mentions that the white efflorescence on brickwork, known to the ignorant as "salt-peter" has been particularly common in that city during the present season, several old buildings which had long been free from it showing as much incrustation as those of very recent construction. A reporter seems to have been enterprising enough to question Dr. Joseph Leidy, President of the Academy of Natural Sciences, upon the subject, and repeats with remarkable correctness what is certainly the true explanation of the phenomenon. According to Dr. Leidy, the efflorescence is composed of sulphate of magnesia, which is in most cases easily shown by analysis, and is produced, he thinks, by the action of the sulphurous acid, always contained in the air of cities, upon the magnesia salts in the mortar with which the bricks are laid. There is, we believe, some doubt whether the sulphurous and sulphuric acid of the atmosphere alone is sufficient to produce the effect. It is always observed that a wall, the top of which is exposed to the rain, or which receives water into its interior in any other way, soon shows a copious efflorescence, as if the magnesia salt was dissolved in the heart of the wall and brought to the surface by the evaporation of the water, so that some imagine that the coal used in burning bricks about Philadelphia and other sea coast towns may leave a sulphurous deposit within their pores, which acts on the lime, or rather on the cement, with which they are built.

In the above Dr. Leidy expresses the correct explanation of this annoyance, which we gave some time since in the Notes and Queries department of this journal. It is unquestionably due to the action of sulphuric acid on the magnesian mortar commonly used in Philadelphia. The action of sulphuric acid from coal-burned bricks is quite subordinate to the other.

BOILING WATER IN A SIEVE.—If we cannot carry water in a sieve, science has told us how we may boil it in such a vessel. There are numerous ways in which this curious experiment may be performed. One of the simplest is the following: If the open mouth of a glass bell-jar, of any diameter, from 10 to 20 inches, be closed by means of a piece of coarse muslin and then depressed into a vessel of water, the water may be drawn up into the bell jar by aspiration through a tube attached to an orifice at the top. On being raised out of the water the jar will be found to retain its contents, the muslin mesh performing the functions of capillary tubes. At each of the meshes there is a well-marked meniscus. A Bunsen burner may now be lighted and placed beneath the water, the temperature of which may be raised even to boiling without any of its contents escaping through the meshes. It will fall, however, if the boiling is too violent.

BRICKS FROM SLAG.—The utilization of slag waste is fast assuming considerable economical importance. The manufacture of bricks from granulated blast-furnace slags will soon be begun in Germany. The slags are run into water, and the grit thus obtained is mixed up with lime, concrete or plaster of Paris, and formed into bricks, which are dried for a month. They possess greater solidity than common brick, and seem to resist a much greater pressure.

SOLVENTS FOR CAOUTCHOUC.—The best solvent for caoutchouc is said to be caoutchoucine, which is obtained by subjecting rubber to dry distillation. Other well known solvents are chloroform, carbon disulphide, resin oil, coal naphtha, rectified spirits of turpentine, tar, the oils of lavender, sassafras and rosemary, and benzine (petroleum spirit). Pure oil of turpentine dissolves 49% of caoutchouc. A mixture of 6% to 8% of absolute alcohol and 100 of carbon disulphide is said to be an excellent solvent. Sulphuric ether, which alone is a poor solvent, dissolves more readily if about 5% of absolute alcohol is added. Hot alcohol dissolves out about 4% of a soft resin. It is sparingly soluble in not fused oil; readily at a gentle heat in melted hog's lard, or in very hot whale oil. After swelling up in oil of turpentine, or in naphtha, it is soluble in hot linseed oil.

PAPER FROM A NEW SOURCE.—A new branch of industry has sprung up in Sweden lately—the fabrication of paper from moss, not from the living plant, but from the bleached and blanched remains of mosses that lived centuries ago, and of which enormous masses have accumulated in most parts of Sweden. A manufactory of paper from this material has begun operations near Jönköping, and is turning out paper in all degrees of excellence, from tissue to sheets three-quarters of an inch in thickness. These latter are harder than wood.

ALUM WATER FOR EXTINGUISHING FIRES.—M. L. B. Demas, member of the French Academy of Sciences, has discovered that water saturated with alum has superior value in extinguishing fires—a value supposed to be due to the coating it gives to objects wet with it, which prevents contact with the oxygen of the air, and thus diminishes the rapidity of the combustion. Experiments are to be made by supplying the firemen of Paris with instruments to throw it, and the Minister of the Interior has recommended that the firemen of the French communes or towns be supplied with facilities to use such solutions of alum.

ELECTRIC PATENTS.—There were 190 patents granted in Germany between May and October for inventions connected with electricity. Telephones are being adopted on a scale of increasing importance in that country, there being now—according to the statements made at a recent meeting of the Berlin Electro-technical Society—telephonic arrangements in eighteen German cities, comprising 3,785 different stations. The total length of the telegraphic lines used in the above telephone services is 540 miles, these lines comprising single wires 4,017 miles in length.

IF Javelle water be put on fruit stains in linen or other fabrics, and immediately washed out in soap-suds, the stains will be eradicated. If Javelle water is not at hand use chloride of lime, four ounces to a quart of water; shake and allow to settle, then apply to the spots, rinse in clean water thoroughly before applying soap. This precaution must be observed, or the fabric will be left harsh and stiff. Any drug store can supply you.

GOOD INK ERASER.—Lime water, with a small quantity of acetic acid, makes a good ink eraser. It should be carefully secured from exposure to retain its strength. It is usually kept in a bottle closed either with a stopper or a cork or bung of beeswax or gutta-percha. But with the utmost precaution that can be taken, it will still be necessary to make a fresh preparation from time to time.

GOOD HEALTH.

Milk and Oil in Disease.

Dr. W. W. Townsend, a well-known physician in Philadelphia, in writing to the *Scientific American* on the use of milk as a diet in dysentery and typhoid fever, says: "I am now in my 75th year, and have witnessed several epidemics of dysentery, typhoid, scarlet, and relapsing fevers, smallpox, measles, etc., and have used milk in every case coming under my care for near 40 years, in every stage of the disease. I will not say it is a cure, for I do not believe in the so-called 'cures' and 'specifics.' Milk is the natural food of all mammals. It not only sustains life, but promotes the growth of every part of the system. No other article contains all these ingredients. It is the recuperative power of nature that performs the cure; and he who studies how to assist it by sustaining the system is the best physician, and milk is one of the best agents that can be used. In dysentery I prefer fresh buttermilk, and all the patient wants is perfect rest, and discard all irritating cathartics and purgatives. Mercury in any of its preparations is poison in dysentery or scarlet fever, and the physician who gives them will never be successful. If his patient recovers it will be despite his treatment. I will add that in smallpox and scarlet fever I anoint the patient from head to feet with olive oil, by means of a badger brush, and repeat as often as it disappears, thereby allaying the heat, keeping open the pores of the skin, producing quietude, preventing congestion of the capillary circulation, and obviating the necessity of anodynes. I have practiced the greasing for 35 years, and was sneered at by my medical brethren for it and the milk treatment. Now, I believe it is in general use with the best results.

THE SIN OF FRETTING.—There is one sin which, it seems to me, is everywhere and by everybody, underestimated, and quite too much overlooked in valuations of character. It is the sin of fretting. It is as common as air, as speech so common, that unless it rises above its usual monotone we do not even observe it. Watch any ordinary coming together of people and see how many minutes it will be before somebody frets—that is, makes a more or less complaining statement of something or other which most probably everyone in the room, or on the stage, or the car, or the street corner, as it may be, knew before, and which most probably nobody can help. Why say anything about it? It is cold, it is hot, it is wet, it is dry; somebody has broken an appointment, ill-cooked a meal; stupidity or bad faith somewhere has resulted in discomfort. There are always plenty of things to fret about. It is simply astonishing how much annoyance and discomfort may be found in the course of every day's living, even at the simplest, if one only keeps a sharp eye out on that side of things. Even Holy Writ says we are born to trouble as sparks fly upward. But even to the sparks flying upward, in the blackest of smoke there is a blue sky above, and the less time they waste on the road the sooner they will reach it. Fretting is all time wasted on the road.—Helen Hunt.

A LIVE SNAKE IN A HUMAN STOMACH.—The following item, with slight alterations, is taken from the *Oakland Tribune* of recent date: The reprint is only after a personal interview with Mr. Wright, who assures us it is strictly correct. We have known the gentleman for many years, and believe him to be perfectly reliable. "Mr. Alfred Wright, a mining expert, who resides on Eagle avenue, between Park and Everett, Alameda, and who has, of late, been giving his attention to the raising of fruit trees, has been singularly ill for two years past. He was troubled with strange movements in his stomach, and afflicted with an inordinate appetite. He tried various physicians without obtaining relief, most of them pronouncing his malady dyspepsia. He finally went to treating himself. Recently he has had fears in reference to some living thing within him, and abstained as far as possible from food. He then took some herbs, which actually killed whatever it was. During the past two weeks he was relieved of a brown snake three or four feet long. A portion of the skin, by actual measurement, was fifteen inches in length and one inch in diameter. His impression is that he swallowed it while drinking water from a stream in the mountains. This is one of the most remarkable cases on record. Mr. Wright is doing well."

RESPIRATION AFFECTED BY FOOD.—A very careful examination by Dr. Speck of the changes produced in the respiratory process by the use of fatty food, of coffee, quinine, alcohol and water, and by the inspiration of air respectively rich in carbonic acid, poor in oxygen and rich in oxygen, has led him to the following conclusions: With an increased proportion of hydrogen in diet, the amount of air inspired and expired decreases, and nutriment, such as sugar, which contains little hydrogen in comparison with their oxygen, involves more exertion of the respiratory organs than such as are rich in hydrogen like the fats; the more carbon predominates in the food in proportion to hydrogen, the more air is exhaled in proportion to that inhaled; the more carbon increases in the diet in proportion to hydrogen, the more carbonic acid is evolved and the more oxygen is taken up—while the richer the diet in hydrogen the less oxygen is required. An atmosphere containing five per cent, or six per cent, of carbonic acid could be breathed for some minutes without oppression; at 11.51% great exertion would be needed to breathe for one minute; at 7.2 all carbonic acid produced in the body is retained in the blood.

SMOKING BOYS.—A medical man, struck with the large number of boys under 15 years of age he observed smoking, was led to inquire into the effect the habit had upon the general health. He took for his purpose 33, aged from nine to fifteen, and carefully examined them. In 27 he discovered injurious traces of the habit; in 22 there were various disorders of the circulation and digestion, palpitation of the heart, and a more or less taste for strong drink. In 12 there were frequent bleedings of the nose, 10 had disturbed sleep, and 12 had slight ulceration of the mucous membrane of the mouth, which disappeared on ceasing the use of tobacco for some days.

CONSUMPTION.—Koch's discovery of the true nature of tubercular consumption has naturally raised the hope that some means may be found to destroy in the system the organisms producing the disease. Mons. De Korah has recently described to the Paris Academy of Sciences an interesting experiment bearing on the subject. Tubercular matter from a guinea pig was placed in 10 tubes under favorable conditions for development. Into three of the tubes helenine was introduced. At the end of a week the matter acted upon by the helenine had lost its infective power, while that in the other tubes still readily produced tuberculous.

BLACK CORN, it is said, has been raised in Livingston county, N. Y. It is described as being as black as an African, as sweet as sugar, and retains all these attributes when cooked.

MINING SCIENTIFIC PRESS

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W. B. EWER.

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W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Jan. 13, 1883.

TABLE OF CONTENTS.

EDITORIALS.—Miners' Association of California; The Tariff and Mining; State Mining Bureau; The Blake Sinking Pump, 17. Passing Events; Foundry Notes; California Quicksilver, 24. Horse Power of Water Wheels; Mining Exhibitions, 25. Patents and Inventions; Notices of Recent Patents, 23.

ILLUSTRATIONS.—Blake's Sinking Pump for Mines, 17. Horse Power of Water Wheels, 25.

MECHANICAL PROGRESS.—What Dr. Siemens Expects from the Gas Engine; Length of Rails for Railways; A Helping Hand; Waste of Power in Friction; Edge Tools, 19.

SCIENTIFIC PROGRESS.—Sunbeams; Curious Fact Concerning Boiling Water; Purification of Sulphuric Acid by Crystallization; Sealing and Signaling; Scientific Suggestions; Science in Japan; Meteoric Hailstones; Proposed New Scientific Phrases; Obstacles to the Cultivation of Science; Silexium Instead of Carbon; Cold or Hot Gas; Jupiter's Spot, 19.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Assessments, Meetings and Dividends, 20.

NEWS IN BRIEF.—On page 20 and other pages.
 MINING SUMMARY from the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon and Utah, 20-21.

USEFUL INFORMATION.—How to Judge of Good Grinding; Efflorescence on Brick Walls; Boiling Water in a Sieve; Bricks from Slag; Solvents for Caoutchouc; Paper from a New Source; Alum Water for Extinguishing Fires; Electric Patents, 23.

GOOD HEALTH.—Milk and Oil in Disease; The Sin of Fretting; A Live Snake in a Human Stomach; Respiration Affected by Food; Smoking Boys; Consumption, 23.

CORRESPONDENCE.—Notes from Eureka, Nevada, 25.
 MISCELLANEOUS.—California State Geological Society, 13. The Tariff on Lead, 18-23. The Denver Exposition—No. 22, 22.

Business Announcements.

Rock Drills—Edward A. Rix, S. F.
 Engines and Boilers—H. G. Beckett, S. F.
 Hoisting Engines—Edward A. Rix, S. F.
 Dividend Notice—Northern Belle Mill & Mining Co.
 Dividend Notice—Silver King Mining Co.
 Assessment Notice—Gould & Curry Silver Mining Co.
 Mining Engineer—George Madeira, Santa Cruz, Cal.
 Mechanical Engineer—W. W. Bailey, S. F.

Passing Events.

This week the Legislature has convened at the State capital. The retiring and incoming Governors have sent in their messages, and the work of making laws has been commenced. We shall during the session keep track of all that is of interest to the mining or manufacturing community.

The deliberations of Congress on the tariff question are being carefully watched by those interested in several branches of the mining industry. Some changes are contemplated which will be detrimental to those interests.

From the various States and Territories where precious metal mining is carried on, come tidings which show an increased yield for the past year. We shall shortly issue our annual mining review, which will give a summary of the year's progress in all quarters.

A DISPATCH from Virginia City states that the honanza folks are having abstracts of the titles of all the mines, from Potosi to Belcher, made. Five men are at the job, which will take nearly a month. This is supposed in Virginia City to mean a movement in the flooded mines under one management.

THE Wood River Times reports hundreds of certificates of new locations poured in on the Recorder of that district on the two first days of January, indicating that much jumping of claims must have taken place.

Foundry Notes.

Most of the foundries of this city are pretty busy just now, considering the season of the year. The main work is mining machinery, but a great deal of other work is being done also. Perhaps the heaviest piece of work, aside from the mining machinery now being made, is that of the second dredger for the Panama canal, which is now nearing completion at the Golden State and Miners' Iron Works. This second machine is the same size as the first one which was made by these works and shipped East. The big scow on which the machinery is to be placed was launched the other day at Port Richmond, Philadelphia. The machinery is all to be placed in position and tried somewhere there, and then the upper part will be taken down and stowed in the hold, and the scow towed to Panama. The new machinery now being built here will be shipped East and put on another scow, which will then be towed to Panama. A third one is to follow, work being already commenced on it here.

There are about 300 tons of iron in the machinery of each one of these dredgers. The dredge is a bucket one with endless chain. There are about 40 buckets, and 16 of these a minute discharge into a large pipe at the top of the machine, the mud passing through this pipe to the bank or levee which the machine is to form. Where there is sand a hydraulic nozzle is used to wash the sand out of the buckets in case it shows a tendency to stick; but this is not necessary in digging mud. The main driving engines are each 100-horse power, and they are made in a most substantial and plain manner. There are also three other pairs of engines, of 20-horse power each, for raising and lowering the buckets, handling the spud, etc. Steam is used for all purposes, and one man can control all the mechanism. In fact, only five men altogether are necessary to run the machine. The scow on which the machinery is placed is 100 feet long and 60 feet wide. The whole dredge cost about \$150,000. The machine is on the plan of that which has been doing such effective work on the tule lands of this State, under the supervision of General Williams. The work accomplished has been so remarkable that a great many Eastern people have come here especially to see it work. The engineer of the Panama canal was one of these, and Col. Totten, U. S. A., also reported on it. The first machine had a stump-pulling apparatus, which the others have not.

In addition to this work this foundry has just sent away a 10-stamp mill to Mexico. The mill was all made in sections for convenience in packing on mule back. All the pans, settlers, etc., were made in the same way. A 10 stamp silver mill has been made for Silver district, Arizona, just above Castle Dome. Pans, settlers, rock breaker and the usual things go with this mill.

They are also making a Wheeler rock breaker for Globe district, Arizona, and doing considerable bridge work for Mexico. They are making a good deal of iron work for Carter Bros., of Newark, Alameda county, who are doing an immense business in building cars for narrow gauge railroads. The foundry has just sent off a lot of hydraulic elevators for Portland, Oregon. They are making quite a number of Milliken's hydraulic ram elevators, which are taking first rate. A great many of this style of elevators are being introduced, as they are seen to be perfectly safe from accident, and are durable and strong. In many new buildings this form of elevator is taking precedence. It has been put in most of the new large buildings recently put up, as Phelan's block, Fair's building, and at Huntington, Hopkins & Co.'s and many other places.

The Golden State and Miners are building two rock crushers or pulverizers of E. Chiquette's patent. There are a few of these machines running here, and one of these being built is for a man who has been using one for some time.

MACHINERY AT THE DENVER EXPOSITION.

In our special notice of "Machinery at the Denver Exposition" we inadvertently omitted to make allusion to the really fine and large exhibit made by Messrs. Fraser & Chalmers, of Chicago. The motive power by which nearly all the machinery in the building was driven was an improved 24x28 Corliss automatic out-off engine, with two 60-inch boilers, each 16 ft. long, with a Baragwanath improved. The engine was rated at 250 horse power, and was employed to drive a 25 inch belt with a 16 ft. wheel. In addition, they also exhibited a Comet quartz crusher, a double Huntington quartz mill, an improved Frue vanner, and an assortment of other smaller machinery. They also exhibited a 30-horse-power engine for driving dynamo machines, with 25 electric lights, embracing two 10-light and one 5-light Weston machines with 25 lamps. Their exhibit, taken altogether, was one of the best and most extensive single displays in the building. Messrs. Fraser & Chalmers have their general office at Chicago, with branch offices in New York, Butte City, Montana, and Denver, Colorado.

ASBESTOS gloves are made and sold in considerable quantities by the H. W. Johns Manufacturing Co., of New York.

California Quicksilver.

The Industry and the Tariff.

The production of quicksilver is one of the most important interests of the Pacific coast, representing a capital of \$30,000,000, and giving permanent employment to more than 5,000 men, who are paid liberal wages. For many years, while the article was protected by a duty, the business was profitable to the producers, and some 30 mines were in operation in the State. Within the last few years, since quicksilver was placed on the free list, and owing to competition with foreign producers, particularly of the Almaden mines in Spain, which are owned and worked by the Spanish Government, and the Idria mine in Austria, worked by the Austrian Government, the price has been reduced to so low a figure that the California quicksilver miners say there is no profit to them in the business.

Eight mines only are now being worked in California, as follows: Quicksilver Mining Company, New Almaden, J. B. Randol, manager; Sulphur Bank, Parrott & Co., agents; Great Western, P. Palache, President; Redington, John F. Redington, President; New Idria, Thomas Bell, President; Santa Clara Mining Association, of Baltimore (the Guadalupe), Henry May, receiver; Oakland, Thomas Bell, trustee; Napa Consolidated Mining Company. It is represented that the total amount received for sales of this article during the last three years has not paid the cost of production, allowing for depreciation in works and exhaustion of the mines. Owing to the richness of the Spanish and Austrian mines, and the fact that the cost of labor in those countries is not more than one-sixth of what is paid in California, quicksilver cannot be produced in America to compete with the product from Spain and Austria, and unless some relief and protection is given, this important interest must give way to foreign competition.

Owing to the high rate of transportation between California and the Eastern States, foreign quicksilver can be sent from Europe to New York at one quarter the freight and in one-third of the time that it can be sent from San Francisco. The freight from here to New York is two cents per pound, or \$40 per ton. From London to New York freight is \$12 per ton, and it takes 10 days from London and 21 days from here. The mines here cannot therefore sell their product in New York. Last year London sent to New York 12,000 flasks—1,000 flasks a month, but shipments East from here must cease under such conditions.

Many articles necessary for the working of quicksilver mines, particularly iron, steel, coal, etc., are subject to high duties, thereby largely increasing the cost of production. Empty quicksilver flasks are subject to a duty of 35%; that many of the flasks used in California are flasks of American make returned from foreign countries, on which the quicksilver manufacturers here are obliged to pay the high duty, often many times on the same flasks, while foreign flasks filled with foreign quicksilver are imported into the United States free of duty! Owing to these facts, all of the American market east of the Rocky Mountains has been lost to California manufacturers, and supplied with a foreign product which pays no duty nor revenue in any way to our Government; but, on the contrary, is protected and favored over the American product to the extent of 35% duty, paid by the American mines on empty flasks, which are classed under the head of manufactured iron.

The imposition of a duty on quicksilver would lead to no hardship or damage to other industries in this country, the article being used over many times in gold and silver mining, so that the small advance in price would practically be almost nothing in the cost of mining, while the only other industries which would be affected—the manufacture of vermilion and the manufacture of medicinal preparations from mercury, both of which are small in comparison with the manufacture of quicksilver—are now protected by a duty.

Owing to the great extent and richness of the Spanish mines, as compared with any mines in this country, and the low rate of labor in Spain, the Spanish Government can at any time produce quicksilver in sufficient quantities to supply the consumption of the world, and at a price which would close every mine in this country. The control of this Spanish product is a practical monopoly in the hands of Messrs. Rothchild, of London, who have the control of the Spanish mines production for 30 years to secure the payment of a loan to that Government. There is a very large accumulation—more than 100,000 flasks—from the products of these mines now in London.

Prior to the manufacture of quicksilver in California the price of foreign quicksilver was more than treble the present price, and, should the California mines, which are practically the only competitors of the Spanish and Austrian Governments' mines, be, for want of protection, driven from the field, the price of the foreign article would be advanced to a rate that would compel the consumers of quicksilver in this country to pay a hundredfold more than the imposition of a duty on the American product would cost them, and practically subject the mining of gold and silver in America, for which quicksilver is indispensable, and the price of bullion to the control of foreign governments.

product of quicksilver. In 1874 the price in London was advanced to one dollar and seventy-five cents per pound. It is now selling in San Francisco at 34½ cents per pound. The admission free of duty of the only product manufactured exclusively by foreign governments (which themselves have a high protective tariff), to the detriment and ruin of an American industry, is an anomaly in our revenue laws which the quicksilver miners want to see at once removed.

Careful estimates recently made from the different mines show that for every flask of quicksilver manufactured, nine days' actual labor is used, which, at the low average of two dollars per day, would make the amount paid to workmen \$18 for every flask manufactured. It is now selling for less than \$26 per flask, and the amount over what is paid for actual labor will not pay the cost of fuel, powder, flasks, steel and other materials protected by duties and necessarily used in the mining of cinnabar ore and its reduction to quicksilver. It seems almost a self-evident proposition that if any article of American manufacture is protected, quicksilver should share in such protection.

All other metals of American manufacture, from native ores, iron, copper, zinc, nickel, lead, etc., are protected by high duties; quicksilver, which under the present foreign government competition seems to require it more than any other, forming the only exception. The business is subject to all the extraordinary risks and uncertainties of mining, with the added costs and difficulties of converting the ore into quicksilver and finding a commercial outlet for it.

Contrary to the general supposition, there is no tariff on quicksilver, though the daily papers have been publishing dispatches saying the duty was about to be removed. It has been free of duty since 1874. Under the old tariff the duty was 15 per cent. *ad valorem*, and ranged in amount from 10 to 25 cents per pound. All these facts have been presented to Congress in a memorial from the quicksilver miners of California, who ask to have a specific duty of from 15 to 20 cents per pound imposed, 15 cents being, in their opinion, the lowest figure which may enable American manufacturers to compete with the Spanish and Austrian Governments and give a fair return for capital invested.

In conversation with the manager of the most extensive mines in California, the writer was told that unless some such duty was imposed, in three years there would not be a quicksilver mine at work in this State. In fact, several will close down this year unless the duty is put on the metal. California is particularly interested in this matter, as she is the only producer of quicksilver in the United States. General Rosecrans, the Representative to Congress from this district, has actively interested himself in the subject, and by persistent and intelligent work, is bringing the matter before Congress in such a way that there are strong hopes among the quicksilver miners—thanks to his help—of carrying the point.

CASKS OF STEEL.—An English firm has recently turned their attention to the manufacture of casks and barrels of steel. The two edges of the sheet of steel which form the cask are brazed together in such a manner as to justify the title of "seamless," which the patentees have applied to those productions. The head of the barrel is also riveted to the body, so as to leave no seam, and the end rims are shrunk on hot, thus making a very solid end, whilst, at the same time, the rims are thick enough to give a good purchase to the grapples of hoists and cranes for loading and unloading purposes. The hush for this tap does not project beyond the rim, so that the nozzle is not liable to be knocked about and injured. The casks are more durable than wood, less bulky, and it is said lighter—an eighteen-gallon steel cask weighing some ten pounds less—a not inconsiderable consideration as regards transit. In point of shape the steel barrel is exactly that of a well-formed wood one.

THE Evening Star mine, which has been the pride of Leadville, has ceased producing. The mine has paid dividends to the amount of \$1,500,000, and its gross product has amounted to something like \$3,000,000. The Leadville Chronicle, in speaking of the mine, says: "We must not be understood as intimating that the Evening Star is exhausted, but simply that the managers see themselves near enough to the end of the resources to incline them to direct their attention chiefly to the work of exploration."

A COMBINATION OF ASBESTOS AND INDIA RUBBER has been very successfully introduced in its application to valves of large size for steam by Mr. B. Rhodes, of London. The advantage of the material consists in its great durability under steam, as the heat does not affect the asbestos, and new settings can be readily applied without breaking any joints or removing the body of the valve, a point of great consideration where a large mill is depending on the steam valve for motive power.

SELLING PATENTS.—George B. Davis, the well-known agent for the sale of patents in the United States and Europe, has moved his office from 503 California street to room 14 over Wells, Fargo & Co.'s bank, corner California and Sansome, as will be seen by our advertising columns.

Notes From Eureka, Nevada.

[From our Regular Correspondent.]

The actions of the accumulator for the Eureka Con. new machinery are at hand, and Mr. Moore, from the Edison Iron Works, at San Francisco, is here to superintend the erection of them. When all is ready, the sinking of the high shaft will be resumed, and in a few months we shall know a little about what there is below the 12th level.

What is going on at the Richmond mine it is difficult to tell, and can only be guessed at. At the last bi-yearly meeting of the stockholders in London, Eng., it was shown that the company, during the past six months, have realized a net profit of £30,000—or nearly \$150,000. A letter from Mr. Probert, the manager of the company at Eureka, was read at the meeting, showing that there is still a vast amount of unprospected territory in the Richmond mine; it also states the gentleman's views in respect to the future of the property, which are decidedly favorable. At the Richmond reduction works there are now

Two Forty-Ton Furnaces Running.

One of them was started up this morning, and is working splendidly. The smelters and helpers say that no furnace ever built in this district has made such a clean start. It was built under Mr. Probert's direction and according to his own plans. This afternoon I went to

The Albion Mine,

And under guidance of Mr. John Williams, the foreman, got in the cave and was lowered down to the main level, through which we passed to the junction and thence southeast to the foot of a ladder on which we climbed through an uprise to the foot of an incline leading up to the Mammoth cave. From there we continued going upwards until the top of the cave was reached, and then sat down to catch our breath now nearly exhausted. From the top of the cave we again commenced climbing, and reached the June drift 75 ft. above it. This brought us to the June chamber, which I can but imperfectly describe. We rested on floor A, below which are three other floors, X, Y and Z. Above it are six floors, B, C, D, E, F, G, making in all 10 floors. These are laid on massive square sets of timbers six feet high, six feet long and five feet wide from centers to centers. Where the square sets are now there was originally ore, but at present most of the space has been filled in with waste rock and earth, leaving a walled up passage through it to admit of ingress and egress. From floor A we descended through the June winze to the November level, and then proceeded to the November cave. Here we found but one man at work. He was prospecting, and had just struck a bunch of ore, fine looking and giving indications of making into a body. From this point we passed up through another portion of the June chamber to the X, Y and Z floors. By the marks on each post we could tell precisely what part of the chamber we were in, and by the same marks I noticed that the chamber was 45 ft. wide and 85 ft. long on these floors. It is also 60 ft. from top to bottom as far as explored; but as there is still a plenty of ore in sight, there is no telling where it will end. We next retraced our steps and went through the November drift to a chute into which the ore from the June cave is dumped and conveyed to the main level. Mr. Williams now placed me in charge of a miner, and went to look after his men. My next point was the east raise, to reach which we had to go back to the Mammoth cave. Again we started from this point, and, going directly to the east raise, found that a large amount of ore had been removed since my last visit, and all the way up the raise there is from three to eight or ten feet of ore, making, in a northerly direction, as I judge (not having a compass with me, I had to rely on my judgment as regards direction, and may be somewhat at fault in regard to it). Upward we went a great distance, keeping the ore at our left hand all the way up and dipping away from us. This, I think, is the December cave, but I am only guessing, as my present guide could tell me nothing. We again retraced our steps to the October drift, and thence found our way to the October cave. Here were

Miners Taking Out Ore

In the same manner as laborers would take sand from a sandbank; no timbering, but working up against a bank of ore over 20 ft. high at the breast. By means of a ladder we climbed up over this, and, going through a natural hole in

lime rock, reached the January cave, where the ore is making strong towards the surface. The Albion is certainly a big mine, and, considering the immense amount of territory that it covers, it is reasonable to suppose that it cannot be worked out for a great number of years. The amount of exploration work done and the manner of its performance speaks volumes for E. N. Robinson, the superintendent. The development of a mine is by no means "baby work." It requires brain, engineering skill, labor, energy, perseverance and a large amount of money. Of all these Eureka district is much in need. Did she possess them we could show to the world the highest mining camp upon the face of the globe.

I hear that the Bald Eagle and Pioneer mines, now in litigation, are to be consolidated.

A Suggested Consolidation.

I would respectfully suggest that these, the Danderberg series, Connolly, "California and Silver King, and the Golden Rule" series (the last named contains 60 acres of good mineral ground), should all be consolidated into one or two good strong companies, such, for instance, as the Richmond Con. or Eureka Con., with ample means to develop the ground embraced in the several claims. There is no doubt that in various portions of these claims vast deposits of ore exist, no matter what may be said by persons peculiarly interested in making it appear to the contrary. I will now call attention of the readers of the MINING AND SCIENTIFIC PRESS

To Adams Hill

At the Horne Tony work on the shaft has been

Horse Power of Water Wheels.

In the accompanying table, which is designed to show graphically the horse power of water wheels, the lines of horse power are parallel and equidistant. The lines of heads in feet are parallel and are set at distances from 0 proportional to the cube of the square root of the head in feet. The lines of diameters are drawn diagonally, and intersect the lines of heads in feet proportionally to the squares of the diameters.

In order that the diagonal lines should not be too crowded, those representing diameters from 5 inches up to 24 inches have been drawn from one corner, while those from 25 inches up to 72 inches have been drawn from the adjacent corner on the line of 0 feet head. The lines of horse power are numbered increasing from the origin of the lines of diameters which they are designed to measure.

To illustrate the method of using this scale, take two examples. First, a 30-inch wheel under 70 feet head. Following the line marked 70 in the margin of "Heads in feet for large wheels," to its intersection with the diagonal of 30 in. diameter and then going back from the opposite side of the diagonal in the line of horse power, the figure in the margin will indicate 200 horse power.

Second, a wheel of 15 inches diameter under 300 feet head. Taking the line marked 300 in the margin "Heads in feet for small wheels," to its intersection with the diagonal of 15 in.

Mining Expositions.

In his message to the Legislature of this State Governor Perkins speaks as follows of the recent mining exposition at Denver, Colorado: In the month of June last I received from Governor Pitkin, of Colorado, an invitation from the Directors of the National Mining Exposition, to be held at Denver in the months of August and September, requesting me to appoint a commissioner to represent this State therein. Believing such representation would be advantageous to our people, and be the means of advancing its commercial as well as its mineral interests, I urged on Warren B. Ewer, Esq., of San Francisco, the acceptance of such appointment. His commission as such agent was forwarded him, and in accordance therewith he proceeded to discharge the duties required of him. His report, which accompanies this message, is the strongest evidence of the wisdom of the appointment, and further shows the necessity of the State's encouraging such expositions; the meager exhibition of the mineral and metallic production of California does not speak very favorably of the business qualifications and energy which is the boast of a Californian.

I commend the report as full of suggestions, many of which, if adopted, would bring the State more prominently before the commercial and scientific men of the world, as well as to those who are seeking to create homes, thus advancing the Commonwealth in all its varied interests.

I respectfully call your attention to the fact that no appropriation was at my command to pay any of the expenses incurred by Mr. Ewer, and he was so informed, with the understanding, however, that I would refer the matter of compensation to you. I therefore ask that the Legislature pay the same, being the trifling sum of \$121.

An appropriation of \$5,000 was made at the last session to provide for a proper representation of California at the World's Exhibition, to be held in New York in 1883. None of this money has been used, the exhibition having been postponed, hence the small sum recommended above may well be granted.

I have been officially notified by James De Fremery, Esq., Consul of the Netherlands, of the intention of his Government to hold an International Exhibition at Amsterdam during the present year, and inviting the participation.

of this State therein. Great efforts are being made to insure its success. This exhibition offers a rare opportunity to bring to notice the resources and advantages of California. The leading countries of Europe have already taken measures to have their several industries represented therein. The great usefulness of these international exhibitions has so frequently been demonstrated that it seems unnecessary to call special attention to them.

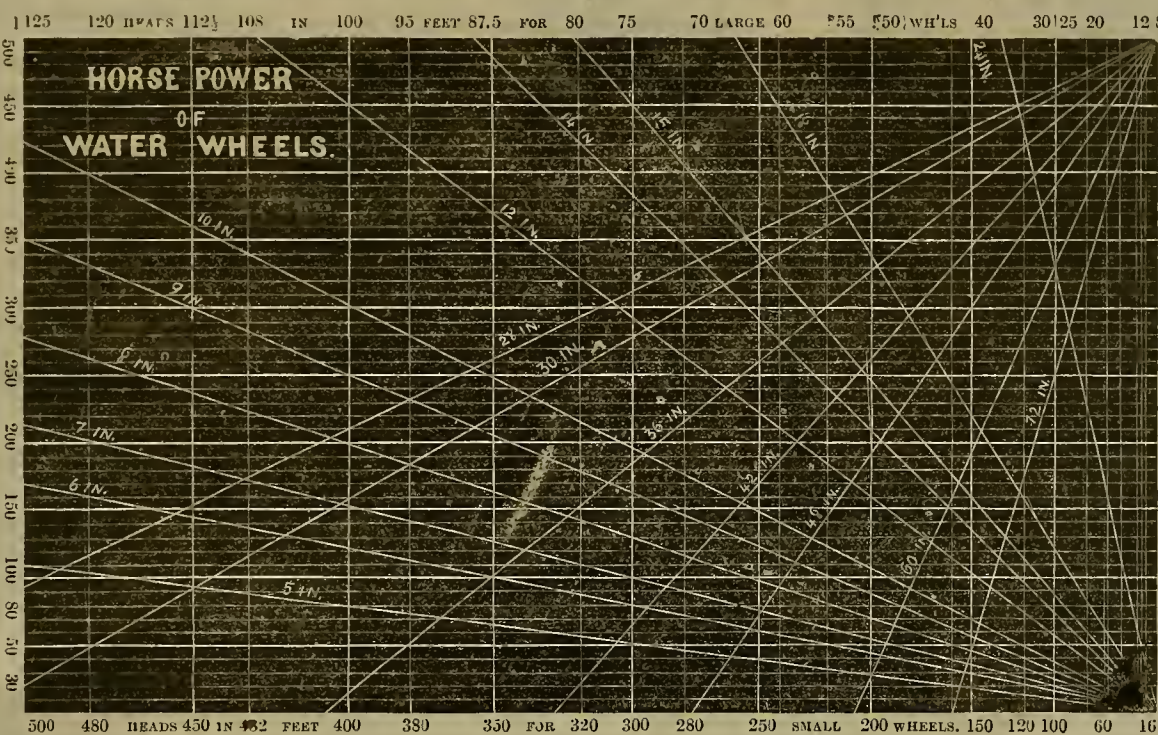
The State should avail itself of this opportunity to impress the advantages for settlement, for agricultural and industrial pursuits, etc., upon the multitudes that will visit this exhibition, and who will carry their acquired knowledge and impressions to every nook and corner of Europe.

I have been informed that articles representing the resources of California, with specimens of her minerals, would be donated for this purpose if the expenses incident to their care and transportation were provided by the State.

A FEW years ago copper leads in Montana were given the go-by by prospectors as valueless. Nothing but gold and silver prospects were considered worth the trouble of locating and recording. To-day copper is the most valuable product, and the rich copper mines of Montana are attracting fully as much attention abroad as her silver bonanzas.

LOCATING AT MIDNIGHT.—At Omo there was a crowd on hand New Year's for the purpose of relocating jumpable claims. Many were up till after midnight—till Monday morning was fairly ushered in—waiting about bonfires (which they had built in various places in the hills) for the moment to arrive when they could legally post their notices.

THOMAS DONOVAN was killed in the Huhn & Hunt mine, Nevada, by a cave last week. He landed in California in early days and he worked in the mines and mills of the Comstock for several years.



quit for the present to prospect for a "grub stake," the parties leasing and taking out flux, of which there is a great deal. There is also three or four tons of high grade ore on the dump.

At the Rio Members the main shaft is down fifty feet, and a cross cut has been driven forty feet on solid hard quartz that will work about \$15 per ton, which as soon as hoisted to the surface is bought by the Albion Company at \$2 per ton, and by them hauled to their furnaces to be used as flux for their own ores. Through the quartz are veins of carbonate ore running from \$90 up to \$165 per ton.

At the Silver Lick series a new double compartment shaft is being sunk, from which at a depth of 50 ft. from the surface a drift is being run to strike the lode. The extreme east end of the series is leased to parties who have been sinking out some good quartz, but have quit that for the purpose of sinking on the ledge to where they believe they will strike it higher than near to the surface. Molino and Frazier have over 100 sacks of fine rich ore on the dump, and are still going for more of the same kind. From the Herculean is being shipped for flux to the Albion eight tons of quartz per day. At Eureka No. 2 are indications around and about the shaft of a mine. There is quartz beside the dump, but as the windlass drum had been removed from the standards, and there was no person to let me down into the shaft, I cannot say whether the quartz was taken out of it or carted there from some other place. On Prospect mountain there is considerable activity, but during the past week I have had but little chance to take notes on that way. One of the important enterprises in that portion of the district is the Monumental tunnel, now in about 350 ft. in hard lime rock, which the contractors say is changing to softer ground. In fact they think they are in the casing of the ledge; but of this more anon.

M. H. JOSEPH.

Eureka, Nevada, Jan. 8, 1883.

The Miners' Association, which is making the debris fight, has issued a call for more money.

diameter, and following the "horse power" line from the same side of the diameter line to the margin it will be found to indicate 450 horse power.

The diagram is drawn upon a basis of useful effect of 80 per cent. of the theoretical power of water, and a full gate opening having a fixed proportion in square inches to the diameter of the wheel in lineal inches. This is one of the diagrams accompanying the drawing of Schussler & Eckart's water wheel, in the circular of the Union Iron Works of this city.

LARGE PEARLS.—The Pacific, of Mazatlan (Mexico), has the following: The largest pearl in the world has been found recently in Lower California (Mexico) by one of the fishers (or divers) belonging to the firm of Gotzalk and Ruffo, merchants at La Paz (L. C.). The pearl is of the dimension of a lemon, weighing 75 carats and measures one inch in length and three-fourths of an inch in width. It took the fisher who opened the shell several minutes to extract the pearl. There is no doubt that the coast of Lower California is very rich. The largest pearl known before was also found on that coast, in Loreto (L. C.), in the time of the Jesuits, and adorned the crown of the Queen of Spain.

JAMES BROWN, chief engineer of the Ourario mine, Park City, Utah, died in Salt Lake City on the 22d of last month. Deceased was 49 years of age, and a native of Preston, England. He was formerly foreman of the Gold Hill foundry, and subsequently held the position of chief engineer of the Ophir mine.

BULLION OUTPUT OF LEADVILLE.—The bullion product of Leadville district the last quarter was as follows: Pounds lead, 17,009,228; ounces silver, 1,336,112; ounce gold, 2,921. Total currency value, \$5,783,127. Total value of output for the last four years is as follows: 1879, \$10,333,740; 1880, \$14,187,697; 1881, \$13,170,567; 1882, \$18,220,893.

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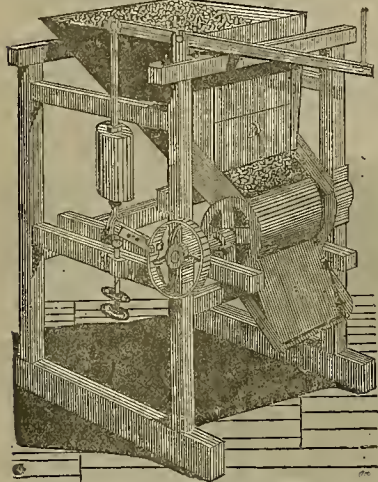
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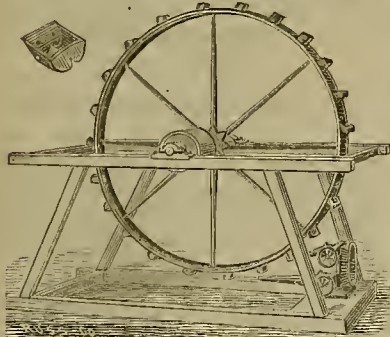
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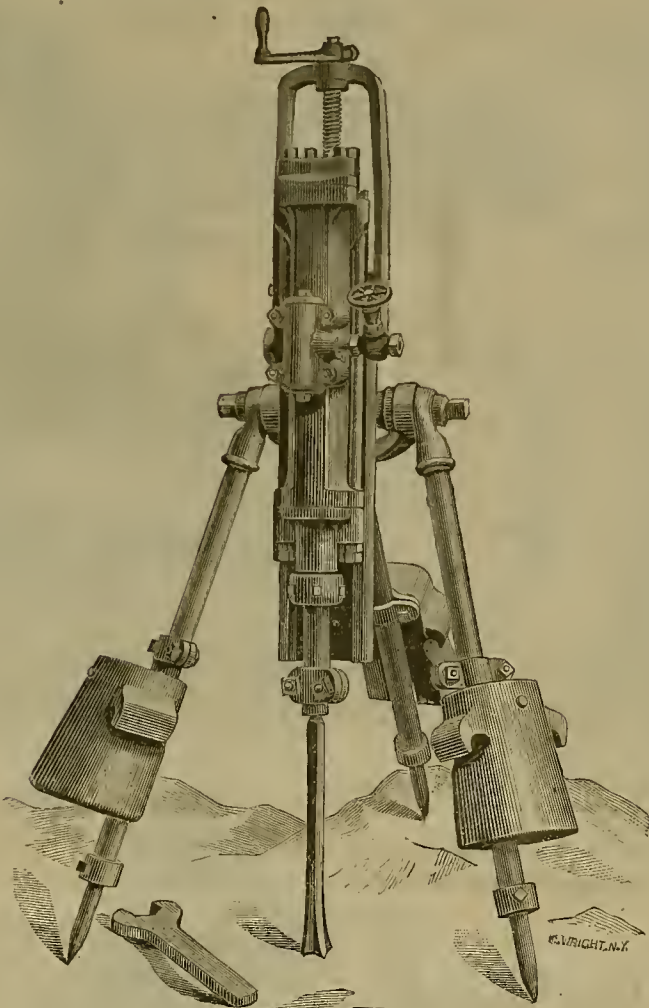
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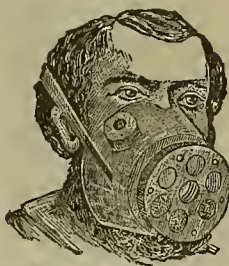
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PATENTS AND INVENTIONS

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252, Market St., S. F.

- For Week Ending January 2, 1883.
- 270,171.—CAR COUPLING.—Wm Adams, Salem, Or.
 - 269,949.—CAR COUPLING.—Geo. W. Bedbury, Portland, Oregon.
 - 269,912.—FAUCET.—J. L. Berry & S. Gladney, Antelope, Cal.
 - 270,001.—CRAIN SEPARATOR.—Daniel Best, Albany, Or.
 - 270,007.—EQUILIBRATING APPARATUS FOR PUMPING AND OTHER MACHINERY.—Chas Bridges, San Fernando, Cal.
 - 270,008.—LADDER.—Chas Bridges, San Fernando, Cal.
 - 269,852.—FRUIT STONER.—J. M. Harlow, Brighton, Cal.
 - 269,855.—SAFETY APPLIANCE FOR ELEVATORS.—L. H. Heydemann, S. F.
 - 269,863.—IRON AND ILLUMINATING STAIRS.—P. H. Jackson, S. F.
 - 269,948.—FEATHERING PADDLE WHEEL.—Chas. Megow, S. F.
 - 269,952.—HAND ROCK DRILL.—E. Moreau, S. F.
 - 270,009.—CORK EXTRACTOR.—Robt. Morgau, Stockton, Cal.
 - 269,903.—HAND OR WIRE VISE.—S. B. Whitehead, S. F.
 - 269,982.—TWO-WHEELED VEHICLE.—O. A. Wright, L. H. Fowler and S. Shaw, Napa, Cal.
 - 269,983.—STOCK CAR.—A. V. Anderson, Virginia City, Nev.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press American and Foreign Patent Agency, the following are worthy of special mention:

DEVICE FOR BREAKING BALKY HORSES.—Joseph Lucas, Los Angeles, Cal. No. 269,539, December 26, 1882. This invention relates to a device for breaking or overcoming the fault of horses which refuse to move at times, commonly known as "balky horses." It consists in the employment of two hoots or inclosing pieces of leather, which are fitted around the front legs of the animal just behind the knees, and have a cord or strap attached to them from the front and passing through a pulley, which is fixed to the front end of the pole, so that when the animal moves properly and freely the strap runs freely back and forth through the pulley with the reciprocal action of the front legs. If, however, the animal refuses to travel, the other animal of the team will start the wagon, and the consequent pull upon the hoots will force the unwilling animal to start.

WATCH REGULATOR.—Julius C. Landmann, Dutch Flat, California. No. 269,538, December 26, 1882. This invention relates to an attachment for regulating the speed of watches, and it consists of a segment rack attached to the outer end of the regulating arm. With this meshes a pinion, the shaft of which extends through the watch and has another pinion upon the opposite end, which is engaged by the teeth of a gear wheel, the shaft of which extends through the face and has an index-arm secured to it. By moving this index-arm the regulator is adjusted without opening the watch, a circular scale showing the amount of adjustment made.

The Garland Sewer Gas Trap.

The Garland improved sewer gas trap for wash-basins, sinks, bath-tubs, seems to be a sure seal against sewer gas and back water. With or without vent pipes, danger from siphonage and evaporation is avoided. A loaded metal ball valve, slightly heavier than water, is ground into its seat, resting two and a half inches under the water or exit pipe. This valve floats up and around the large chamber while the water is running out, and after the flow falls gently into its seat. There is a trap screw at the bottom which is easily removed for cleansing or recovering anything of value that might drop through a basin or sink. The Garland trap received the first premium at Mechanics' and State Fairs. It has been endorsed by the Oakland Board of Health. There is no department of invention that has been put to stronger tests than that of plumbing, to keep out sewer gas. The inception of many of our worst diseases is due to the escape of sewer gas through our dwellings. The Garland trap is recommended highly by J. P. Gaynor, Aug. Laver, P. Huernie, John Marquis, Wolfe & Son and other leading architects. It has been put in most of the new buildings of late, such as Phelan Block, Union Square Hotel, Page, Westerfield & Co.'s building, etc. The old-style traps have been taken out and these put in A. J. Ralston's house, Arcade house, Post Office block, Galindo hotel and Central block, Oakland. In that city also the traps are used in the houses of G. W. Mannel, S. J. Harvey, C. W. Crane, C. J. Forest, F. S. Page and others. S. H. Seymour, of the Russ house, also uses them. They are in Holbrook & Merrill's big building, are used by W. W. Montague, and among leading plumbers by Thomas Day and others. These references are enough to show the favor in which the trap is held, as will be seen by our advertising columns. The Garland Sewer Gas Trap Manufacturing Co., of Oakland are makers.

DEBILITATED persons and sufferers from wasting diseases, such as consumption, scrofula, kidney affections, will be greatly benefited by using Brown's Iron Bitters.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Jan. 11, 1883.

ANTIMONY.—		
Per pound.....	—	@ 15
IRON.—		
American, Pig, soft, ton.....	—	@ 31 00
Scotch, Pig, ton.....	27	@ 29 00
American White Pig, ton.....	—	@ 30 00
Oregon Pig, ton.....	—	@ 30 00
Clippers (Cap. Nos. 1 to 4).....	—	@ 30 00
Refined Bar.....	4	@ 5 50
Horse Shoes, keg.....	—	@ 5 50
Nail Rod.....	—	@ 7 75
Norway, according to thickness.....	6 1/2	@ 7 75
STEEL.—		
English Cast, lb.....	16	@ 25
Black Diamond, ordinary sizes.....	15	@ 14
Drill.....	15	@ 16
Machinery.....	12	@ 14
COFFEE.—		
Ingot.....	—	@ 22
Sheet.....	37	@ 39
Sheeting, Thine 14 1/2.....	—	@ 31
Nails.....	—	@ 3
Bolt.....	—	@ 33
Old.....	—	@ 8
Bar.....	—	@ 15 1/2
Cement, 100 lbs.....	—	@ 15 1/2
LEAD.—		
Pig.....	4 1/2	@ 5 1/2
Bar.....	—	@ 6
Pipe.....	—	@ 9
Sheet.....	—	@ 9
Shot, discount 10% on 500 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 10
Pack.....	—	@ 2 50
Chilled.....	—	@ 2 50
TIN PLATES.—		
Charcoal.....	7 25	@ 7 50
Coke.....	6 25	@ 40
Banca Tin.....	—	@ 25 10
Australian.....	—	@ 25 00
J. C. Charcoal Roofing 14x20.....	—	@ 6 90
ZINC.—		
By the Cask.....	—	@ 9
Zinc, sheet 7x3 ft. 7 to 10 lb, less the cask.....	—	@ 10
NAILS.—		
Assorted Sizes.....	4 00	@ 4 75
QUICKSILVER.—		
By the flask.....	—	@ 37 1/2
Flasks, new.....	—	@ 1 25
Flasks, old.....	—	@ 1 05

ASSESSMENTS falling delinquent on mining stocks in January amount to \$810,070, levied by 20 mines, against \$462,400 in January, 1882, and \$780,500 in 1881. Of this month's assessments Nevada mines call for \$285,800, California \$514,270, and Arizona \$10,000.

The Horn Silver mine of Utah produced over \$3,000,000 last year, and paid \$1,200,000 in dividends.

The Secret

of the universal success of Brown's Iron Bitters is simply this: It is the best Iron preparation ever made; is compounded on thoroughly scientific, chemical and medicinal principles, and does just what is claimed for it—no more and no less.

By thorough and rapid assimilation with the blood, it reaches every part of the system, healing, purifying and strengthening. Commencing at the foundation it builds up and restores lost health—in no other way can lasting benefit be obtained.

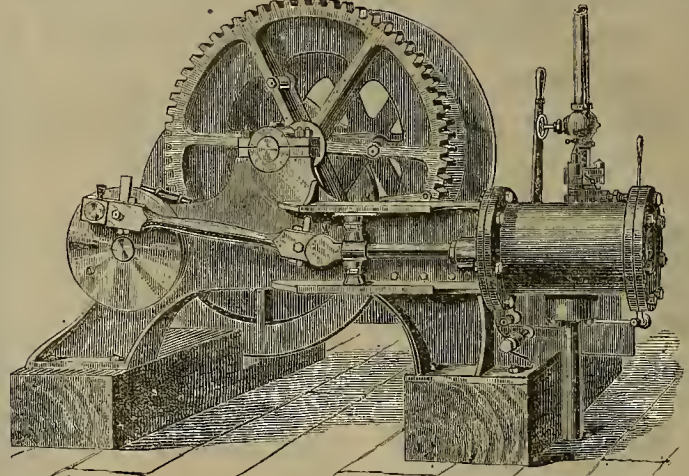
75 Dearborn Ave., Chicago, Nov. 7.

I have been a great sufferer from a very weak stomach, heartburn, and dyspepsia in its worst form. Nearly everything I ate gave me distress, and I could eat but little. I have tried everything recommended, have taken the prescriptions of a dozen physicians, but got no relief until I took Brown's Iron Bitters. I feel none of the old troubles, and am a new man. I am getting much stronger, and feel first-rate. I am a railroad engineer, and now make my trips regularly. I can not say too much in praise of your wonderful medicine. D. C. MACK.

BROWN'S IRON BITTERS does not contain whiskey or alcohol, and will not blacken the teeth, or cause headache and constipation. It will cure dyspepsia, indigestion, heartburn, sleeplessness, dizziness, nervous debility, weakness, &c.

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Mining and Other Companies.

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DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company

San Francisco, January 2, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 37) of twenty-five cents (25c.) per share was declared, payable on MONDAY, January 15, 1883, at the office of the Company, Room 19, No. 325 Montgomery Street, San Francisco, California. Transfer books will close January 6, 1883, at 12 M.

JOSEPH NASH, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill & Mining Company.

San Francisco, January 10, 1883.

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 28, of fifty cents (50c) per share, was declared, payable on Monday, January 15, 1883. Transfer books closed on Thursday, January 11, 1883, at 3 o'clock P. M.

WM. WILL, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Company

ASSESSMENT, NO. 44.

Levied..... January 10, 1883
Delinquent..... February 15, 1883
Day of Sale..... March 8, 1883
Amount per Share..... Fifty Cents

ALFRED K. DUBROW, Sec'y.

Office—Room 69, Nevada Block, 309 Montgomery St.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, January 2, 1883

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 50, of twenty-five cents (25c.) per share, was declared, payable on Friday, January 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company in New York.

WM. WILLIS, Secretary.

OFFICE—Room 29, Nevada Block, No. 309 Montgomery St., San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Navajo Mining Company.

San Francisco, January 3, 1883.

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 5, of twenty-five cents (25c.) per share, was declared, payable on Friday, January 12, 1883. Transfer books closed on Saturday, January 6, 1883, at 12 o'clock M.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine St., San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company.

San Francisco, December 26, 1882.

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 14, of five cents (5c.) per share, was declared, payable on Friday, January 12, 1883. Transfer books closed on Tuesday, January 2, 1883, at 3 o'clock P. M. This dividend is payable at the Farmers' Loan and Trust Company in New York on all stock issued there, and at the office in this city on all stock issued here.

WM. WILLIS, Sec'y.

OFFICE—Room 29, Nevada Block, No. 309 Montgomery St., San Francisco, Cal.

DIVIDEND NOTICE.

San Francisco Savings Union

532 California Street, cor. Webb.

For the half year ending with December 31, 1882, a Dividend has been declared at the rate of four and thirty-two one-hundredths (4.32) per cent. per annum on term deposits and three and sixty one-hundredths (3.60) per cent. per annum on ordinary deposits, free of Federal tax, payable on and after Wednesday, January 17, 1883.

LOVELL WHITE, Cashier.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending December 31st, 1882, the Board of Directors of THE GERMAN SAVINGS and LOAN SOCIETY has declared a dividend on Term Deposits at the rate of four and thirty-two one-hundredths (4.32-100) per cent. per annum, and on Ordinary Deposits at the rate of three and six-cents (3.6-100) per cent. per annum, free from Federal Taxes, and payable on and after the 2nd day of January, 1883. By order, OEO. LETTE, Secretary.

NATIONAL COMPRESSORS and ROCK DRILLS.

EDWARD A. RIX, Agent,

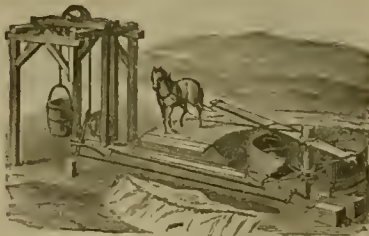
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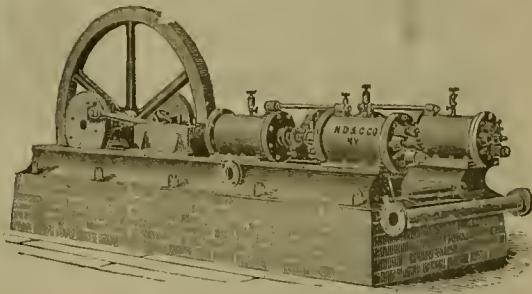
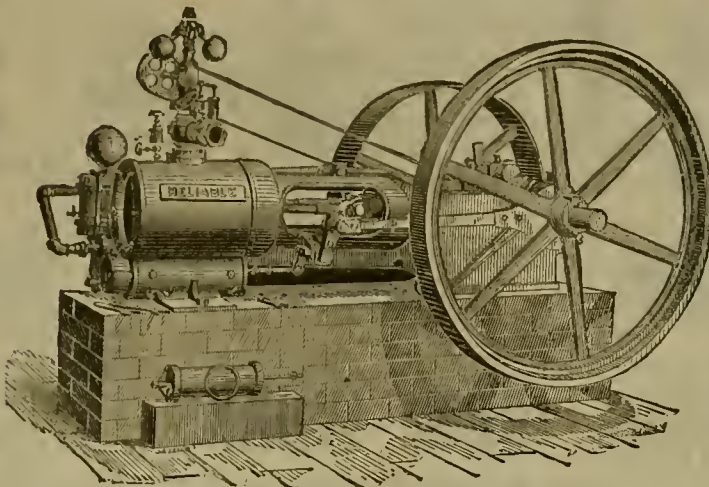
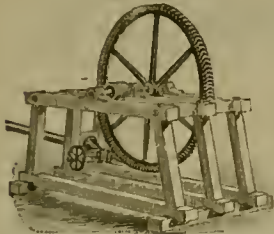
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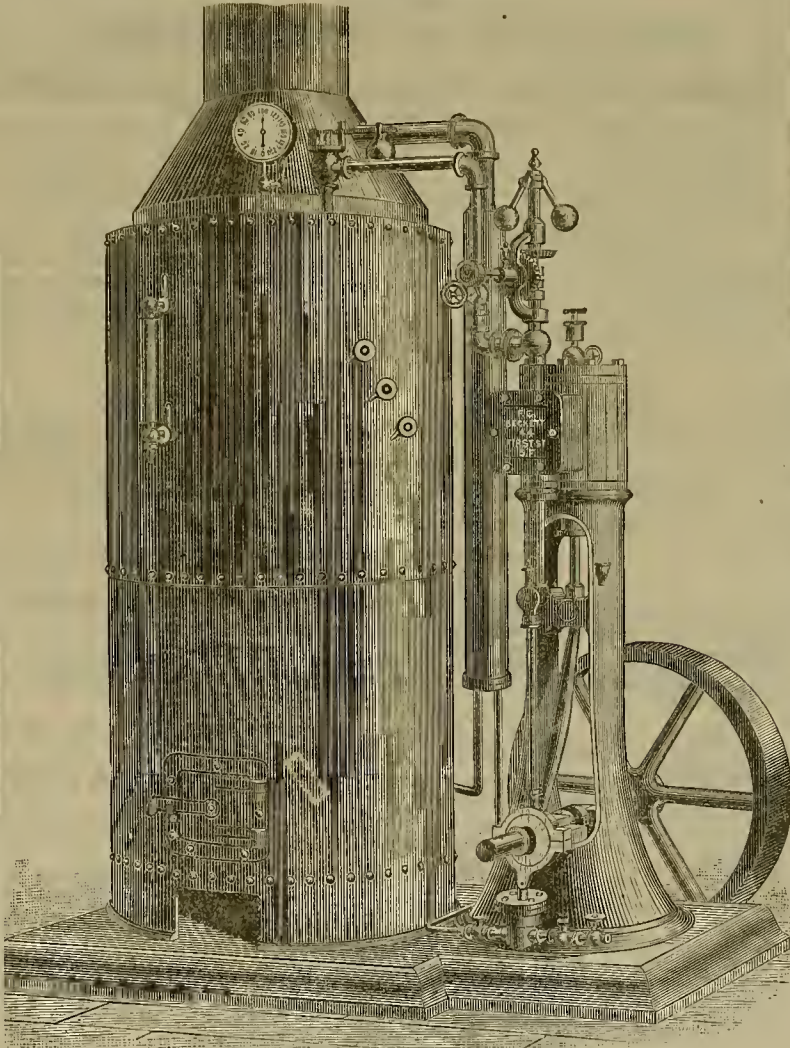
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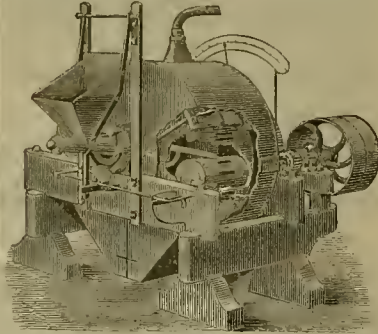
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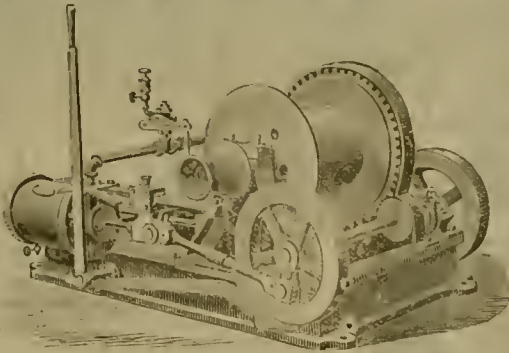
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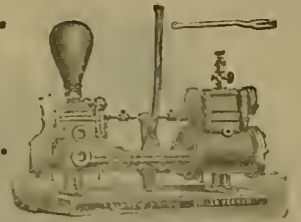
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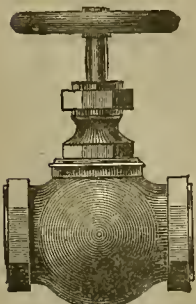
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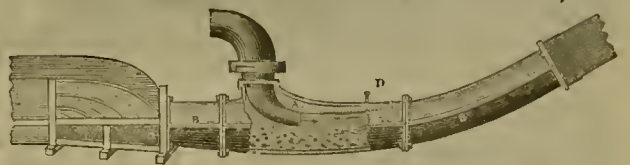
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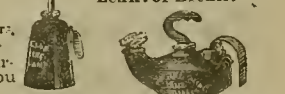
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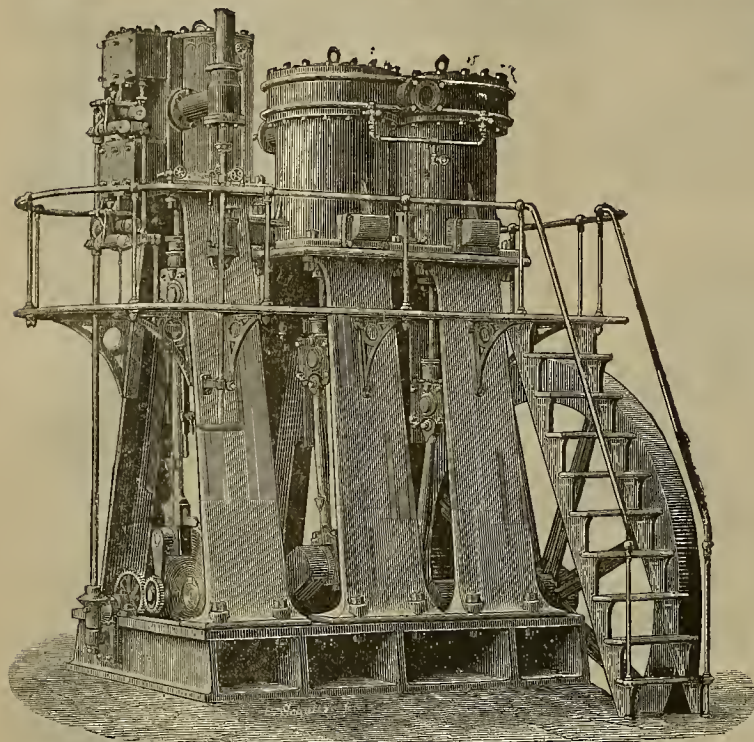
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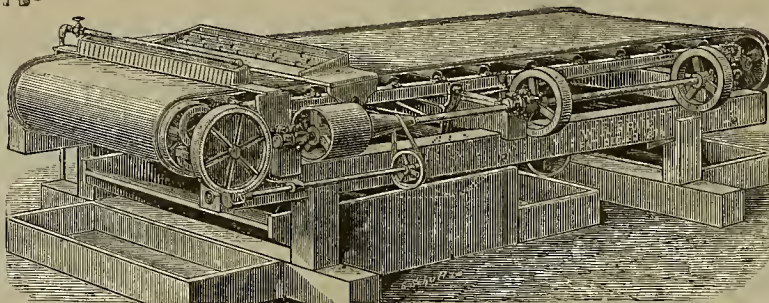
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That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

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Nov. 6 1882

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MINING AND SCIENTIFIC PRESS.

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Number 3.

The Heald & Morris Engine

Edward A. Rix, of 47 and 49 Fremont street, in this city, has the agency of the upright and horizontal engines of Heald & Morris. These are efficient, low priced and economically worked engines. All work of a showy and ornamental nature, which enters largely into the costs of engines generally, all complicated and expensive mechanisms for operating the valves, etc., have been practically dispensed with. These things add greatly to the cost, and as engines of this class pass largely into the hands of those quite inexperienced in their attendance, it is absolutely necessary that complicated mechanism should be avoided as far as possible.

As will be seen from the engraving, these engines are of a somewhat novel yet graceful design, giving in the highest degree, for the weight of material used, and which is ample for all contingencies, that strength and rigidity of parts essential to durability and economy in wear, and freedom from vibration and noise when in rapid motion.

The working strain acting on a line through the center is self-contained, rendering it practically impossible for them ever to become out of line. Requiring a very small floor space, they are more compactly built than any horizontal engines of equal power, and from shortness of stroke and great strength of parts, admit of a high rate of speed.

The cylinder is steam-jacketed, with steam chest on bottom, giving perfect and instant drainage, and all cast in one piece. The piston is packed with self-adjusting inside and outside metallic rings. The valve is simple and inexpensive in construction. It is as perfectly balanced as one running in a horizontal position can be made, and requires the minimum of power for its operations. It exhausts through its center into the heater, giving no pressure on steam chest covers nor leakage at any point.

The feed pump is simple and durable; accessible in case of stoppage by simply loosening one nut and without disconnecting pipes. The water heater is a separate part, and so attached as to have no effect from its expansion and contraction on other parts, and has perfect drainage. The engines are furnished with best make of governor, and can be set to make the engine run at any speed desired.

The crank shaft, connecting rod and shafts, are of the best forged iron. Anti-friction metal is used for the shaft boxes and bronze metal boxes for both ends of the connecting rod. The cross-head is of steel with steel wrist and bronze metal gibs adjustable to wear. The piston rod is of steel, and all the material and fittings are as perfect as mechanical skill and good facilities can give. All parts are made in duplicate, so that worn out or broken parts may be readily and cheaply supplied.

There are five sizes of the Heald & Morris horizontal engines sold, from an 8x8 to a 14x12. The engraving shows the "Reliable," which is made from 20 to 45-horse power, with cylinder 10 inches in diameter and 10 inches stroke, and a 53-inch fly-wheel. This engine weighs 2,800 pounds. It requires a foundation seven feet by two feet, and a floor space over all of eight feet four inches by four feet six inches. This is extreme measurement over all projecting parts, including wheels, pipes, pulleys, etc.

Academy of Sciences.

At the last meeting of the Academy of Sciences Prof. Davidson presided and there was a large attendance. Prof. Hitchcock, of Dartmouth College, who has since sailed for the Hawaiian Islands, addressed the Academy on the subject of "Glacial Moraines." He said an examination of the distribution of moraines had prompted an inquiry as to whether they were deposited by glaciers or icebergs. In his opinion, they are clearly the work of glaciers, and icebergs have in certain localities simply supplemented their work. Late observations now enable us to decide the positions of these great terminal moraines. Their extreme eastern boundary is off the island of Nantucket, and they extend, with occasional interruptions, when cut away by streams traversing them, below Long Island, Staten Island, through New Jersey, Kentucky, Illinois, Missouri, Kansas, con-

and clay were formed by high-water rivers, resulting from melting ice, and prove conclusively the claims of glacial theorists. Some such terraces, remaining as steps, must have enclosed rivers 200 ft. deep at such times. Along the line of the Northern Pacific railroad in Idaho and Montana these successive terrace formations are developed on a magnificent scale. They are exceedingly interesting as bearing on the antiquity of the human race, for on these high terraces are found flint arrow-heads, obsidian spear heads and the remains of early man.

He thought there could be no doubt that man lived as far back as the ice period. It was at first supposed by early glacial investigators that all glaciers originated at the poles and worked their way toward the equator. This theory is now untenable, for we can locate the various ice centers on this continent whence these glacial flows have proceeded, and this has also been done in Europe. In the center of our continent

Expenses of Mining Companies.

It was a wise conclusion that the Presidents of the 10 mining companies in this city came to the other day when they met and resolved to reduce the salaries of all officers, including their own, at the same time agreeing to keep the miners' wages at the present standard.

We have often inveighed against what may be called the "top heavy" system of mining, where very high salaries were paid for officials who performed merely nominal duties, and without whom the actual work in the mine itself could very well go on. It has been, however, to the interest of the men in charge, and having influence in this direction, to keep those high salaries running as long as possible, since they participated in the profits and were themselves benefited.

Of late it has come to be recognized that people would have nothing to do with the stocks of these mines, and the occupation of many of these men was gone. Other people refused to pay assessments, and the stock had to be taken by the company, and would bring no price when sold again. It became evident that in order to restore confidence and keep the mines running at all, some popular move should be made to cut down expenses. Many of these expenses ought to have been cut down long since. If they had been, the mines would have been worked to a better advantage, since money spent on useless officers would have paid miners to do work in the mine, where money should be legitimately spent.

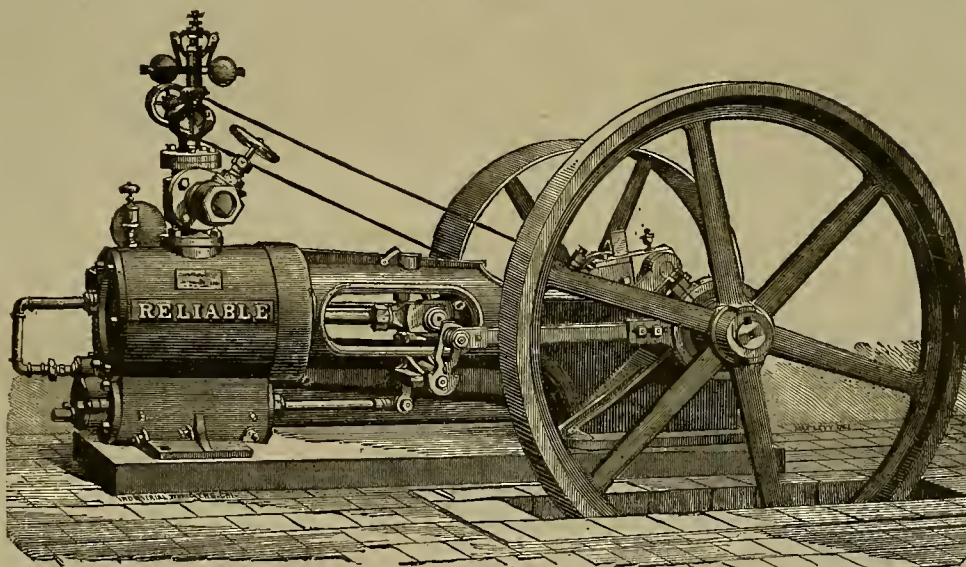
It is even now, however, late as it is, a subject of congratulation to all friends of legitimate mining that the evils of the "top heavy system" are being recognized in this city. They are finding out that in order to do anything with mines they must work them. It is no longer possible to work stocks instead of mines as formerly.

People will invest to a certain point and no further. All the dodges of the stock market are pretty well known, and the public has learned by bitter experience that their money invested in this way is all the money of people who are probably interested on the other side.

With the superfluous expenses cut off, and the ordinary ores reduced, the mines themselves have a better chance of getting what they need to be developed. It was a poor way to raise \$100,000 by assessment, and fritter away \$75,000 of it in useless expenditures, the other quarter going to the mine. With the new order of things now going on there is a much better prospect for the mining interests of the coast.

MINING BUREAU.—A bill has been introduced in the Legislature looking to the better support of the State Mining Bureau, which will give it an appropriation instead of having it depend on the tax on mining stock certificates. It is probable that the collection now at Sacramento will be removed to the Bureau here before long.

THE Pacific Iron works, Rankin, Brayton & Co., San Francisco, are completing at their Chicago shops a 30-ton galena plant for the Campbell Reduction and Milling Company, of New York, to be used on the mines of the company in North Carolina.



THE HEALD & MORRIS "RELIABLE" HORIZONTAL ENGINE.

tinuing to an indefinite distance toward the northwest. This general outline traces the extreme terminal moraines, but many others exist within the outer circle at different irregular points formed by the ice boundaries, varied by the difference in seasons.

Another large glacial area is bounded by a point beginning on British territory, extending through Montana, Minnesota, Iowa, Wisconsin, and forming a loop parallel to Lake Michigan and Lake Erie; thence down to Long Island, and off Cape Cod, whence it extends off into the Atlantic ocean. In the ice age the country stood higher out of the water than now, hence some of these moraines are now submerged under the ocean. Fishermen engaged in our Atlantic coast fisheries bring in great numbers of tertiary fossils, brought up from the shoals off the eastern coast of the United States and Nova Scotia. The large glaciers of the great glacial period were thousands of feet in thickness. The very large kettle holes worn by the erosion of boulders throughout the northwest portions of the continent belong to this general system of terminal moraines. Erratic boulders are distributed over the country, having been transported by moving glaciers on their surface, without abrasion from contact with the surface. He said many claimed that terraces of gravel, sand

there existed at least three pre-historic lakes of great magnitude, which were recently named for purposes of identification. Lake Bonneville was as large as the Territory of Utah, and is said to have been the result of melted glaciers. Lake La Hontaine was another glacial lake between the Sierra Nevada and Rocky mountains. Lake Agassiz was a similar lake in Minnesota, whose extreme southern part was once the source of Red river. These three lakes, long since drained and dry, were glacial lakes.

Mr. J. G. Lemmon read a paper describing the native potato of Arizona. This paper we shall refer to in a future number.

ANNUAL MINING REVIEW.—We shall publish next week a double edition of the MINING AND SCIENTIFIC PRESS containing our "Annual Mining Review." There will be a good deal of interesting matter in this edition for the miners of the coast, each of whom should have a copy. The statistics of production, so far as gathered, will be printed, and the number will be especially valuable for reference.

CONGRESSMAN ROSECRANS says that the Ways and Means Committee have admitted being in error in putting boracic acid on the free list, and they will change their recommendation on the subject.

Southern Nevada.

During our trip through the southern part of Nevada we were surprised at the number of reduction works that had been erected in the different mining camps and laying idle, monuments of folly and mismanagement. If one-fourth the amount of capital had been expended in exploring the mines that has been wasted in erecting those expensive works, our State would to-day be the greatest bullion producer in the world. Valuable mines are lying idle, which, if worked on legitimate business principles, would be dividend payers, but useless expenditures and gross mismanagement have caused stockholders to refuse to contribute any further funds, and the mines and mills have become almost uninhabited, where heretofore all was life and bustle, and not on account of the merits or demerits of the mines, but simply from the incapacity and make all you can for yourself management. Nevada has had "wild cat and stock jobbery" enough, while our neighboring mineral States are enjoying a season of prosperity. Nevada is undergoing a season of dullness unparalleled in her history, and through no fault of her mines or mineral wealth. We believe that our State is the best mineralized State or Territory in the Union, if properly worked, and in all our principal mining camps it has been proved beyond a doubt that our mineral veins are continued to as great a depth, as in any other country in the world. Then why should so many of our mines be lying idle to-day? Let any person who has been a resident of those camps answer the question. Is it through the mines giving out, or account of the poorness of the ore? Can they truthfully say yes in either case? There may be some few exceptions, but the greater number will have to be laid to the incapacity of the management and useless expenditures in salaries to non-producers. How many mines are there whose pay-roll for miners and mill men can equal the amount paid out to supernumeraries, many of whom have never seen a mine and know no more about mining than a cow does about handling a musket. Mining can be made a paying business, and will pay a larger rate of interest on the amount invested than almost any other business, but must be conducted on the same business principles that any other business is conducted on. Then, and not till then, will our State return to its old time prosperity, and it should be the endeavor of all interested in mining and the welfare of the State of Nevada to do all in their power to encourage legitimate mining and discourage wildcat schemes and stock jobberies.—*Levis Herald*.

Vertigoid by the Geologists.

This is the way that the spokesman at a miner's meeting in the Gibraltar mining district, near Casa Grande, put it:

"Fellow miners and citizens: I am not Fitch, the silver tongue, nor am I Beech, the Plymouthian; but I am the rhetorician of these little hills and the vindicator of the miner's wrongs. Egypt had her ten plagues; Pharaoh was swallowed in the Dead Sea, and Beecher swallowed Plymouth church; but greater curses are reserved for Arizona. The locusts from the East, having professional appendages, are now lighting upon our mining camps and darkening our brightest prospects with their inexperience and unjust reports. What do strangers from the East know about our peculiar country? They acknowledge that our veins and ledges are totally new to them, and the pitch of our hills are so peculiar that they have never seen a similarity of them before, and yet, in the face of all these assertions, they render an off-hand verdict on our mines with as much ease and gusto as if they were dining upon roasted turkey. They are shown some of the richest veins and lodes in Arizona, and yet because two or three millions have not been expended in tunnels, winzes and dumps, they turn up their facetious noses, pass sentence derogatory and repack their satchels for civilized Boston. The miner has said more than once, and still repeats it, that the capitalist should be the party acting in these matters; the book student mineralogized and metallurgized let loose from the bank counters and office space of eastern cities are nauseated at the presence of an Arizona desert, and their book-stuffed learning and theories theoretical are dealt out to the hardy-fisted miner in such doses and pills that it seems all practical experience was at nought and only learned men resided in the East. Fellow citizens, am I not right when I say that Arizona is sick, vertigoid by the professors and stupefied by the geological geologists? (Cries of, 'Bravo! good, good, 'tis so, give it to 'em.') My friends, in the future let us place a plate, knife and fork at the miner's table for the reception of the man of means and practical business knowledge who will meet us half way upon reasonable propositions, and let us ignore and banish the learning that stands on hill tops and knows it all. (Great cheering and cries of 'We'll fix 'em.')"—*Tombstone Independent*.

ALCOHOL FROM CHICOORY.—Chicoory will hardly be longer made to serve as a substitute for coffee if it is true that, as a European technical journal asserts, it can be made to give an alcohol of a pleasant aromatic taste and great purity.

Mexican Mining Laws.

We republish from the *Denver Tribune* the following précis of the mining laws of Mexico, contributed to that journal by its intelligent traveling correspondent, "Weaver," written from the city of Chihuahua:

"For the instruction of those of our people who have an eye to mining in Mexico, I have been at some pains to gather correct information as to laws governing mines. There is a difference of opinion here between native lawyers and American interpreters as to the meaning of the mineral laws, especially that part of them which refers to the length of time a mine must be worked during each year, some claiming that a mine must be worked at least eight months, and others four months in each year. I am indebted to Señor Martínez del Río, Jr., an attorney in the city of Mexico, for my interpretation of the mining laws. And I will preface the summary of them by the remark that our own mining laws might be greatly improved by modeling them in some features after the Spanish laws. These laws seem to be particularly adapted to the development of the mineral wealth of the country, whereas ours allow of the longest delay, and even of the holding of the most valuable mines without any production whatever. As is well known, Mexico was captured and held by the Spaniards for its mineral wealth, and the laws the Spanish Government enacted governing mines were with a view to obtaining the greatest production of bullion. Under the old Spanish laws, which are held in observation by the States of the Republic, the right of eminent domain in mineral whether on private or public lands, was always reserved to the government, and no individual or corporation could become the owner of mineral in the earth. The government grants the privilege of working out the mineral under certain fixed conditions, and when these conditions are violated the privilege is withdrawn. These conditions may be briefly stated as follows: The discoverer of an ore body of mineral denounces (claims) the discovery, and must publish or advertise his denouncement after having first established his boundaries. He must then sink a shaft or tunnel 30 ft. on the ledge within 90 days. Then in 30 days more he must dig 30 ft. more. A justice then goes in company with a mining expert, examines the property and measures off 200 yards along the vein, and 200 yards across it, the side lines being located according to the inclination of the vein. If the vein is perpendicular, 100 yards are allowed on each side. If horizontal, 100 yards square are allowed. If the vein dips 45° they measure 150 yards on side of dip from the outcrop, and 50 yards on the other side. The claimant is then put in possession, with a title to the mineral, under the proviso that he must work the mine at least four months in every year, with not less than four men. If he fails to do this work he forfeits all his rights and all work, and the mine may be denounced and taken possession of by the first comer. The mineral wealth does not belong to the general Government, but to the States. The States, however, have retained the old Spanish laws, as proven by experience to be the most wise and best adapted for the development of the mines. The ownership of lands does not affect the right of government to the mineral beneath them, only that the discoverer of mineral on private lands must pay the owner for the surface at its value. The water and timber privileges go with the mineral. Here is, in brief, the essence of the mineral laws of Mexico. With similar laws in force in our country, I believe that the bullion product of Colorado would to-day be quadruple what it is. It seems preposterous that Government should carry the title to mineral lands to individuals or corporations, as is often done in the United States, for no other object than that they may keep somebody else out of possession, or to work stock speculations, or for no object whatever apparent other than the mere desire to own a mine. It is a well-known fact that hundreds of the richest mining claims in Colorado are held under Government titles, and are not producing a dollar of bullion in years. Under the Spanish laws these gentlemen would either have to produce something from the mines or abdicate in favor of somebody else."

THE ÆOLIAN HARP consists of a long, narrow box of pine about 6 inches deep, with a circle in the middle of the upper side of 1½ inches in diameter, in which are to be drilled small holes. On this side 7, 10 or more strings of a fine cat-gut are stretched over bridges at each end, like the bridge of a fiddle, and screwed up or relaxed with screw pins. The strings must all be tuned to one and the same note (D is perhaps the best) and the instrument should be placed in a window partly open, in which the width is exactly equal to the harp, with the sash just raised to give the air admission. When the air blows upon these strings with different degrees of force it will excite different tones of sound. Sometimes the blast brings on all the tones in full concert and sometimes it sinks them to the softest murmurs. A colossal imitation of the instrument just described was invented at Milan in 1786, by the Abbe Gattoni. He stretched 7 strong iron wires, tuned to the notes of the gamut, from the top of a tower 80 feet high to the house of a Signor Moscati, who was interested in the success of the experiment, and this apparatus, called the "giant's harp," in blowing weather yielded lengthened peals of harmonious music. In a storm this music was sometimes heard at a distance of several miles.

Sierra County Mines.

The Sierra county *Tribune* says: It is often a matter of great surprise to many who visit Downieville and notice the unusual advantages offered in its vicinity for quartz miners that no enterprises of this character scarcely are in operation. The first conclusion reached is that there are no ledges in the section worth developing. However, the contrary is the case, and these visitors who do not take the pains to inquire regarding the matter become impressed with false ideas. Of course, these men, with their unfavorable opinions, often work injury to this section on the outside.

On the mountain sides leading north and south from Downieville are numerous ledges that have been prospected, and in many instances they have been developed sufficiently to prove that the rock is of a high character. Too often, however, these ledges have fallen into the hands of poor companies, whose only object in securing them was for corrupt purposes. If these companies could make nothing by other means than legitimately working their properties, then the ledges were abandoned, and, as a matter of course, they are looked upon to-day by those from abroad as worthless.

With the exception of the Gold Bluff there is not a quartz mine in operation to-day near this town. S. Van Slyke, the owner of the Gold Bluff, has alone run this mine and made it one of the best dividend-paying properties in the county. On the other hand is the Good Hope mine, owned by a San Francisco company (purported to be wealthy), who came up here last year and displayed all the pomp imaginable. They erected a fine 20-stamp mill (which was heavily insured), coyoted around in former worked-out drifts for a while, and then then the mill was burned under very suspicious circumstances. The mine is now lying idle, not one iota more prospected than it was the day that the company assumed control of it. Experienced miners say that the Good Hope can be made a paying mine if properly developed.

It does seem to us that if the business men of Downieville would make an effort they might have some of these mills that are lying idle within almost a stone's throw of the town in operation. If the real facts were presented to legitimate mining operators, and the business men would lend their influence, in all probability the desired object could be accomplished. The people of Downieville have been deceived many times by fraudulent companies, but if they would take the matter in hand themselves they might avert so much of this deception in the future. With the utmost confidence in the value of the surrounding mines, and knowing of what benefit they will prove to Downieville, if properly worked, our citizens should endeavor to attract the attention of honest investors to this section, while on the other hand they should endeavor to keep away all companies whose objects have the odor of rascality.

THE ACTION OF LIGHT UPON AMALGAMATION.—M. P. Laur, of Rodez, Aveyron, France, having noticed in Mexico the striking effect of the sunlight upon the activity of the process of amalgamation, has undertaken a number of experiments, which he has communicated to the French Academy of Sciences recently. He placed in a dark chamber a glass vessel containing a solution of 15 parts of salt and 7 parts of sulphate of copper in 100 parts of water. A porous vessel filled with quicksilver was suspended in this solution, and one platinum electrode was dipped into the mercury, while a second, consisting of a leaf of sulphide of silver, was dipped into the copper solution. The wires from both are connected with a galvanometer. When the vessel is placed in the dark chamber and the circuit is closed, the needle of the galvanometer is deflected, showing that the sulphide of silver is the positive pole. As soon as light is admitted to the dark chamber, the needle at once swings back, the current being still in the same direction. Every change from darkness to light, or even in the intensity of the latter, causes variations in the current. The bichloride of copper formed by the mixture of salt and sulphate of copper attacks the quicksilver, and the photo-chloride of copper formed reduces the sulphide of silver. This reduction, however, takes place only under the action of sunlight, and therefore an electric current is produced by exposure to the sun.

AN IMPORTANT INVENTION.—A new process in the manufacture of alkali has just been invented by McTear. The main advantage of his new patent is that it admits of the use of ground rock salt, which is a great saving compared with the white salt. It is said it produces a much improved quality of salt cake. At the same time it effects the decomposition of salt at one-third the cost of the present system—hand labor. This marks an important point in the chemical manufacturing trade of the Tyne district, for if it is successful, as it promises to be, many employers will be able largely to diminish working expenses.

SUBSIDY TO PASTEUR.—The French Minister of Agriculture has lately placed at the disposal of M. Pasteur a new sum of 50,000 fr. (\$10,000) in order to continue his admirable investigations upon the contagious diseases of animals. The Government had already granted to the illustrious savant, for the same object, 50,000 fr. in 1880 and 40,000 in 1881. The minister consulted a special committee, who, in view of the brilliant success obtained by Pasteur in his previous investigations, unanimously recommended a renewal of the grant.—*Les Mondes*.

Air in Mines.

There are two principles which are relied upon to ventilate a mine. That of heat expanding the air and the abhorrence of a vacuum by nature. Add to these a system of pumping or forcing air into a place, and we have the three ideas upon the expansion of which into practical methods all ventilation of mining properties depends. There are various cansees which develop heat in mines. The lamps or candles by the light of which the miner works, the heat given out by the hodies of the men as the result of that work, the oxidation of sulphur, if any be present in the mineral or in the walls, being among them. There may be, too, the heat of thermal springs, or, if the mine be deep enough, that which is found in the rock. If we suppose a shaft to be sunk, say 2,000 ft., and if in the center of that shaft we placed a tube, or box, or any substance, wood, for example, which runs from the surface of the ground to the bottom of the shaft, there would be at once created a circulation of air. The air around the sides of the shaft being heated by the walls would rise, and the vacuum so created would draw the cold air down through the box. But if we kindled a fire below the box, the current of air would be down the shaft and up the box.

The system of ventilating a mine by heat is simply the one which we have imagined expanded to the extent necessary to ventilate the whole mine. If we run off at one side from the bottom of our shaft a level of 500 ft. in length, and carried the box into the face of it, we would have precisely the same thing taking place as before. The air, as heated by the walls, would travel along the level and ascend the shaft, while the cold air would come through the box. If instead of constructing a box we placed a division in the shaft, cutting it into two equal parts, as we do so often in this country, the cold air would descend on one side and the warm air would ascend on the other. Suppose, however, that we had two shafts—one at each end of the level; then the air would come down one, traverse the level and go up the other. The direction in which it would travel would depend altogether upon the size of the shafts or the amount of heat generated. If the shafts were of unequal size the air would come down the smaller and go up the larger. If it is the same the air would move in the direction of that shaft the center or the equilibrium of heat was nearest to. If the center or equilibrium of heat was exactly in the center of the level, and if the friction on the air was exactly equal in each shaft, then we could cause the air to move whichever way we pleased by building a fire at the foot of the shaft we wished it to ascend. Keeping that fire burning for a day would be sufficient to cause the air to ascend that shaft in preference to the other for all time, because the cold air constantly descending through one shaft would cool that shaft off and so move the point of equilibrium of heat nearer to the other.

The ventilation of a mine where pumping is not necessary is merely an expansion of the system which has just been outlined. But there are two most important variations possible in the application of this system. We may either take the fresh air in through a box to the workings or we may take the foul air out. Each has its advantages. In the first we find the introduction of the fresh air and the removal of the foul easier than in the second. In the second the foul air and gases generated by blasts are carried off at once and are not forced to travel through the level to the shaft.

A SPECTACULAR COLLECTION OF ORES.—At the office of H. M. Yerington, General Superintendent of the Virginia and Truckee and Carson and Colorado Railroad, at Carson, is to be seen a rich and beautiful collection of samples of ore from the mines situated in the mineral ranges bordering Owens Valley. These ore samples were collected by Mr. Yerington during a recent trip through that country along the line of the Carson and Colorado road. There are specimens of silver, copper, argentiferous galena and free-gold ores. Many of the samples of copper are very beautiful, showing brilliant hues of blue, green, orange and burnt sienna. These are not only very rich in metal, but also quite ornamental, making magnificent cabinet specimens. One of these fine samples of copper ore is from the Hirsch mine near Independence, and another from the Russ mine, Bishop Creek. From the Union mine, Cerro Gordo, there are specimens of argentiferous galena that are solid masses of metal. This ore runs very high in silver. From the Farrington mine, near Benton, are specimens of chloride ore which are rich. The ore of this mine, now being worked at the Millner mill, Benton, will pay \$200 per ton. From the Poleta and Sacramento mines—both very fine properties—there are specimens of quartz that show very bright spangles of free gold. In short, mining men will be able to obtain a very good idea of the mines in the Owens Valley country by an examination of this collection of ores. Many mines not mentioned above are represented in the collection.—*Evreka Sentinel*.

A CABLE RAILROAD FOR PHILADELPHIA.—Work on the machinery to be used in furnishing the motive power required to operate the first cable street railway in Philadelphia is now rapidly progressing, and it is expected that all necessary preparations will soon be completed.

MECHANICAL PROGRESS.

SELECTING AND USING BELTS.—There are several hundred columns published every year in newspapers on the subject of belts, mostly giving directions how to use them and how to take care of them. But the first thing to be considered is how to select them; for if a man does not know how to select a belt, an article in a newspaper will not teach him much on this subject. A belt is either too small for its work, too large, or just right. It is a difficult matter to tell the exact power required for different machines, because the required power differs at different times in the same machine with the quality or quantity of work to be done. If a belt slips it proves that the traction surface is too small, either from small pulleys, deficiency of circumferential contact or narrow belts. The way out of this is clear; but the practice of putting compounds on belts to keep them from slipping is a narrow, senseless one. There are a few manufacturers who make first class belts and make them all the time, and any one who buys from them is sure to buy a good article. It is a very difficult matter to judge a good belt by looking at it. It is doubtful if any one can judge accurately who is not handling leather as a business. There are a few firms whose business is to make good belts, and they do it. The way out of the difficulty is fixed. Where the power is known, a belt of sufficient size to transmit that power can be determined.

AN ASPHALT MORTAR.—A German paper describes a patented composition made at a factory in Stargard, Pomerania, which has for some years past been used with perfect success on the Berlin-Stettin railway for wall copings, water tables and similar purposes requiring a water-proof coating. The material is composed of coal tar, to which are added clay, asphalt, resin, litharge and sand. It is, in short, a kind of artificial asphalt, with the distinction that it is applied cold, like ordinary cement rendering. The tenacity of the material when properly laid, and its freedom from liability to damage by the weather, are proved by reference to an example in the coping of a retaining wall which has been exposed for four years to the drainage of a slope 33 ft. high. This coping is still perfectly sound, and has required no repairs since it was laid down. Other works have proved equally satisfactory. In applying this mortar, as it is termed, the space to be covered is first thoroughly dried, and after being well cleaned is primed with hot roofing varnish, the basis of which is also tar. The mortar is then laid on cold to the thickness of about three-eighths of an inch, with either wood or steel trowels, and is properly smoothed over. If the area covered is large, another coating of varnish is applied, and rough sand strewn over the whole. The water-proof surface thus made is perfectly impregnable to rain or frost, and practically indestructible. The cost of the material laid is estimated at not more than 5d. per square foot, and it is stated that this price can be reduced by at least 1d. for large quantities put down by experienced workmen.

A NEW METHOD OF MAKING RAILWAY SPIKES.—The machine used in the manufacture of railway spikes by H. H. Fowler & Co., Chicago, consists of two large rolls, mounted in substantial housings, and driven by gearing after the manner of ordinary bar rolls. The center of these rolls contains a groove in which the forming dies are placed. These are twelve in number, are made of special grade of steel and contain the imprint of the spike. The spike, after being rolled into the groove, is forced out by the plunger actuated by interior methods. The rolls are driven at such a speed that the radius of the roll is not assumed by the spike, but it leaves the roll substantially straight. The speed also has the effect of forming the spike, as it were, by a blow. The entire operation of producing the spike consists merely of taking from the furnace the hot billet, about two inches square, running it through but four passes, after which it is fed direct into the spike forming rolls, from which the spikes drop out automatically, at the rate of twelve per revolution. The machine is capable of turning out from 600 to 1200 finished spikes continuously per minute, depending upon the rate of speed at which the machine is run.

KEEP YOUR MACHINERY CLEAN.—It might be urged that in some shops where they want quantity more than quality, no time is allowed to wipe or clean a machine, and the foreman is indifferent how short lived a machine is. In any shop where first-class work is done, a careful mechanic who does his work so that no one can do it better, and takes good care of his machine, will always be appreciated. A man who tries to make short cuts by dumping or grinding a little off the extreme edge of his tools, and works with the points a quarter of an inch lower than the back, is invariably a butcher.

MALLEABLE BRASS.—A German periodical is responsible for the following method of making malleable brass: Thirty-three parts of copper and 25 of zinc are alloyed, the copper being first put into the crucible, which is loosely covered. As soon as the copper is melted, zinc, purified by sulphur, is added. The alloy is then cast into molding sand in the shape of bars.

USE BOTH HANDS.—A writer on mechanical subjects advises young mechanics to cultivate the nerves and muscles of each hand so that they can use a hammer, chisel, file, wrench, or any other tool as well with one hand as with the other; or so that they can turn a handle or hand wheel one way with one hand, and another one the other way with the other hand, both at the same time, or so that they can turn them both one way or different ways at different speeds. Such practice in turning handles will be found indispensable in learning to become an expert on the lathe, planer or other machine tool. All that is required to learn this is a little practice until the motion of one limb or member is not at all governed or controlled by the motion of another.

A NEW TRAM CAR.—At a Bavarian exhibition in Nuremberg lately there was shown, from Noell's wagon manufactory at Würzburg, a tram car which does not require switch and siding on meeting another car. The car is kept on the rails by means of a fifth wheel in front of the others, and catching in a groove between the rails. The guide wheel is set in a triangular frame on the fore axle, and when the driver raises this the car readily leaves the rails, and may be drawn over the street pavement in any direction. Such cars have been successfully used in Hamburg and Lisbon. Of course, the leaving the rails involves greater strain for the horses, but this is only temporary and without serious inconvenience.

WONDERFUL IRON MAKING PROCESS.—M. Bartholmy Brunow, a French metallurgist, is credited with having discovered a method of reducing iron ore to pig metal in the short space of 14 minutes. A lump of African iron ore, weighing 32 pounds, was broken up into small fragments and placed into a crucible. As soon as the ore was at red heat, a reacting substance was added, and in three minutes the liquefaction was complete. The produce obtained was iron. The reacting substance cost about 25 cents per ton. What the reducing substance is has not been stated.

THE Pullman Company are about to engage in the manufacture, on an extensive scale, of freight cars, and have already received orders for some 4,000 cars. Work is now in progress on 10 dining cars for the Northern Pacific, and 6 dining and 6 sleeping cars for the New York, West Shore and Buffalo road. Enough orders are on hand to keep the shops busy for the next year, among the largest of which are 60 first-class and 37 second-class passenger coaches for the Northern Pacific, and 50 passenger and 20 baggage and mail coaches for the West Shore road.—*Industrial World*.

THE FINISHING FILE.—In the hand of one who appreciates its possibilities, a three-cornered file, ground sharp on the sides and rounded toward the end like a bayonet, is a most efficient finishing tool on fine work. It will take out every scratch and leave dead smooth surfaces that require but little rubbing with emery paper. The scraper does not cover up the work as the file does, and is much more speedy in action. Used with saliva on wrought iron or steel it surpasses any other tool for finishing.

AN IMPROVED WOOD SCREW.—Screws used in soft wood are sometimes driven in with a hammer, and given a turn or two with a screw-driver to bring them flush. A manufacturer has brought out a new screw which is adopted for driving and which enters the wood without tearing the grain as the ordinary screw does. The gimlet point is dispensed with and a cone point substituted. The thread has a pitch that it drives in barb fashion, offering no resistance in entering, but firmly resisting all attempts to withdraw it except by turning it with a screw-driver.

SLOTING SCREWS.—A New York City firm has invented a simple machine for rapidly slotting screws, which is said to work satisfactorily and cheaply. It operates so as to require only one downward pressure on the lever to grip and slot the screw. When the lever is released, the screw head is clear of the saw before the jaws relax, but when the lever has reached a certain point, the screw drops out and the jaws are ready for another. The jaw is readily adjustable, and screws of different diameters can be slotted without delay in changing the parts. The machine, which weighs 250 lbs., can be used in milling certain classes of light work.

FROST AND FRACTURE.—Additional tests made by M. Bacle seem to prove that low temperature has but little to do with the fracture of railroad tires. Other things being equal, the tires are as strong, he says, in severe frost as when the temperature is normal; but low temperature increases, of course, the rigidity of the road and its inequalities, and so renders the shocks received by the tires very violent, producing at times disasters which are attributed to changes in the metal.

NAIL MILLS.—In the eastern part of Massachusetts, and with headquarters in Boston, are seven nail mills, operating 300 machines and turning out an average of 10,000 kegs per week, mostly for the home trade, but furnishing shipments for Cuba and South America.

SCIENTIFIC PROGRESS.

The Origin of Life.

Men of science may amuse themselves by speaking of life being brought to the earth by the arrival of a meteor, in reality a fragment of some once peopled world which has been destroyed by conflict with another or by internal disturbance. But this is a more scientific jest than a grave reality. Astronomy knows nothing of worlds coming into conflict. On the contrary, the laws of motion assure us that if anything is so unlikely that it may be regarded as absolutely impossible, it is the encounter of two orbs in mid space; nor have we any reason to suppose that a planet can be rent into fragments by internal convulsions. If we had, we have not the slightest reason for supposing that orbs thus unfortunate would be more likely to be inhabited than their more lucky fellow worlds. If these were inhabited already, we gain nothing by bringing to them the fragments of other worlds which have exploded; and if they were not inhabited, whilst the burst or shattered worlds were, we are called on to imagine (for no one can believe) the absurdity that only inhabited worlds are liable to destruction, for the benefit of those which are without inhabitants. To which absurdity this additional one is superadded, that the seeds of life would survive the destruction of their planet home, and the journeying through millions on millions of years (rather millions of millions) which science assures us they would have to make through the cold of interstellar space before they would fall on any other world. And all these absurdities to no purpose, so far as the origin of life is concerned, for they take us back but a step, which brings us in reality no nearer to all life.—*Professor Proctor, in Belgaria*.

SIEMENS' NEW SOLAR THEORY.—The solar theory lately propounded by Dr. Siemens, President of the British Science Association, does not meet with favor in the eye of Dr. Tyndall, the eminent physicist. Dr. Siemens suggested that interstellar space is filled with various combustible gases, which are drawn in by the sun in its onward march; that these gases rush in from the pole of the sun toward its equator, producing intense heat by their combustion on the sun's surface; that the products of this combustion are then thrown off into space, where, in a highly rarified state they are dissociated by the solar rays and are once more ready to become fuel for another sun. In commenting on this theory Dr. Tyndall says: "It would give me extreme pleasure to be able to point to my researches in confirmation of the solar theory recently enunciated by my friend the President of the British Association. But through the experiments which I have made on the decomposition of vapors by light might be numbered by the thousand, I have, to my regret, encountered no fact which proves that free aqueous vapor is decomposed by the solar rays or that the sun is reheated by the combination of gases, in the severance of which it had previously sacrificed its heat."

NEW SAFETY LAMP.—M. Tricot, the manager of the Mons gas works, at the recent meeting of the Association des Gaziers Belges, described a new fixed lamp invented by M. Lechiem for burning safely while surrounded by an explosive mixture of air and gas, such as may be present in gas works. It consists of a metal bracket (with an orifice in connection with a pipe leading a supply of pure air from a safe distance) securely fixed to the wall, and provided with a groove filled with sand for receiving a projecting collar at the bottom of the lamp, so as to form an air-tight joint. In the bottom of the lamp is a valve, opening inwards, which keeps it closed until placed in position, when it opens automatically. The cover, made separate for facility of cleaning, is also provided with a sand joint, and the trunco-conical chimney is of such dimensions that no air or gas can enter the lamp by its means; while a sheet of perforated metal or wire gauze, placed across it, affords an additional safeguard. When the source of light is a vegetable or mineral oil, the lamp has simply to be lighted in a pure atmosphere before being placed in position, as it contains sufficient air to support combustion for two or three minutes, when the air valve opens. When ordinary coal gas is used, the simplest method is to light a small piece of taper near the burner before fixing the lamp, and making the connection with the gas supply pipe; or the gas may be lighted by electricity, or by a fulminating capsule.

A PRETTY SCIENTIFIC EXPERIMENT.—The following experiment in the way of physics without apparatus is given by a correspondent of *La Nature*. A clay pipe is laid over the top of a large wine glass, and a person is required to bring it down to the table without touching either pipe or glass, without agitating the air or moving the table. The solution of the problem consists in taking up another like glass, rubbing it vigorously on your sleeve, then bringing it near the pipe stem, which is thereupon strongly attracted, so that the pipe falls. This experiment is a pretty variation of the electric pendulum, and shows that pipe-clay, a very bad conductor of electricity, yields readily to the attraction of an electrified body.

M. NORDENSKIÖLD maintains that the aurora is a permanent phenomenon in polar regions, being always seen when the sun is below the horizon and when the moon is invisible.

SPECULATION IN ELECTRICITY.—It is not only the inventors of the world that have now turned their thoughts to electricity, but also the speculators. The progress of the practical science to that degree of industrial perfection which will render it a paying investment from a financial point, is necessarily slow. Some companies have indeed established themselves almost at once as profitable undertakings; but the formation of large money enterprises, on the strength of inventions which are not sufficiently tested, is certain to result in disappointment. The quotations of some of the minor English companies have greatly depreciated. In fact, electricity, though a giant, is yet young, and should not be made a favorite object of speculation. We are in favor of the widest freedom, so far as manufacturing enterprise is concerned, for here there is a solid basis, but the abuse of electric discoveries in England by the "promoters of the undertakings" has already thrown some discredit on solid companies. The shares of some of the branch companies that were formed have declined considerably, others have been obliged to wind up. But whatever stock jobbing misfortunes may be reported, we have no doubt that when electricity comes to be more adapted to all industries, as it will be before long, it will then offer a large and safe field of investment.

SINGULAR LABORATORY EXPLOSION.—E. Miltz, writing from the Leverkusen Alkazine Works, gives an account of an explosion under unusual circumstances: "I take the liberty of reporting to you a peculiar explosion which has taken place in this laboratory. For a number of years I have prepared the chronic acid solution requisite for the analysis of anthracene by adding to five kilos. of chronic acid water and acetic acid in suitable proportions and letting the mixture stand, stirring occasionally, till the whole is dissolved. One bottle of chronic acid, on addition of the acetic acid and water, became suddenly warm, and in a short time began to boil briskly, giving off abundance of fumes smelling like aldehyde. As I saw that the reaction became more and more violent, and that the chronic acid could not be saved, the room was at once evacuated, and scarcely was everyone out of danger when a violent explosion ensued, with formation of dense clouds of chronic oxide. The chronic oxide was of a very loose texture, exactly resembling that formed on heating ammonium bichromate. A fresh quantity of chronic acid (obtained at the same time with the spoiled lot) dissolved quietly in the acetic and water. I am unable, therefore, to explain the cause of the explosion.—*Chem. Rec.*"

NEW PHOTO-ELECTRIC BATTERY.—A new battery, which gives a current on exposure to the action of light, has been devised by M. Saner. It consists of a square glass vessel, containing a solution of fifteen parts common salt and seven parts sulphate of copper in 106 of water. A porous vessel of mercury is placed in the solution. An electrode of platinum is in the mercury, and another of sulphuret of silver in the saline solution. The electrodes are connected by means of a galvanometer, and the battery is fixed in a box sheltered from light. The closing of the circuit displaces the needle of the galvanometer, and it is seen that the sulphuret of silver is the negative pole. When the needle has come to rest, if the battery is exposed to the light of the sun the deviation increases. If the light is suppressed the needle returns to its original position; if a cloud passes before the sun while the battery is exposed to the light the variations of the needle indicate the fluctuations of the electric current. The effect of the battery is due to the action on the mercury of the bichloride of copper formed by the mixture of common salt and sulphate of copper. The proto-chloride of copper which is formed reduces the sulphuret of silver, but this reduction requires the intervention of the solar light, which determines the production of the photo-electric current.—*Les Mondes*.

The largest telescopes in the world are in the United States, the one at the naval observatory in Washington being 33 ft. long, and there is one of the same size at the University of Virginia, in Charlottesville. But the Russian Government is now having a telescope constructed, to be ready this month, which will be 45 ft. in length. The work is being done by Messrs. Alvin Clark & Co., of Cambridge, Mass., under the care of the great astronomer, Otto Struve. It is for the Government observatory in a suburb of Moscow, but will stand in a meadow outside of the principal building. The diameter of the glass is 30 inches.

PROFESSOR KOCH'S DISCOVERY DISPUTED.—At a meeting of the New Orleans Pathological Society Nov. 20th, the President, Dr. H. D. Schmidt, made an important microscopic demonstration to disprove the reported discovery of Professor Koch, in Berlin, as to the bacilli of tuberculosis. Dr. Schmidt claimed to demonstrate that the bacilli thought by Dr. Koch to be the cause of tubercular consumption were simply fatty crystals. Dr. Schmidt's researches have been long and minute, and he is confident that Dr. Koch is in error.

THE GROWTH OF LANGUAGE.—Human languages appear to have grown like trees in a wood, which in the first stage are as numerous as possible, but are soon reduced to a few individuals, of which a very small number attain their full term of life. Numerous as were at first the local manifestations of human beings, the primordial languages were as innumerable.—*M. Julien Vinson*.

Table of Highest and Lowest Sales in S. F. Stock Exchange

Name of Company	Week Ending Dec 28	Week Ending Jan 1	Week Ending Jan 11	Week Ending Jan 18
Albion	20c	20c	20c	15c
Alta	55c	55c	55c	50c
Andes	2.70	3.10	2.80	2.80
Albion	30c	30c	30c	35c
Argenta	30c	30c	30c	35c
Andes	1.95	2.00	2.00	2.00
Belcher	75c	70c	70c	70c
Belmont	4.10	4.10	4.10	3.80
Best & Belcher	1.60	1.60	1.60	1.05
Bullion	60c	60c	60c	60c
Bechtel	60	60	60	60
Belle Isle	1.95	2.10	1.85	2.00
Bodie	1.85	2.10	1.85	2.00
Benton	1.85	2.10	1.85	2.00
Bulwer	1.85	2.10	1.85	2.00
Boston	1.85	2.10	1.85	2.00
Black Hawk	1.85	2.10	1.85	2.00
Bodie Tunnel	1.85	2.10	1.85	2.00
Booker	1.85	2.10	1.85	2.00
Caledonia	1.85	2.10	1.85	2.00
California	1.85	2.10	1.85	2.00
Challenger	1.85	2.10	1.85	2.00
Chollar	1.85	2.10	1.85	2.00
Confidence	1.85	2.10	1.85	2.00
Con Imperial	1.85	2.10	1.85	2.00
Con Virginia	1.85	2.10	1.85	2.00
Crown Point	1.85	2.10	1.85	2.00
Columbia	1.85	2.10	1.85	2.00
Champion	1.85	2.10	1.85	2.00
Concordia	1.85	2.10	1.85	2.00
Con Pacific	1.85	2.10	1.85	2.00
Derby	1.85	2.10	1.85	2.00
Day	1.85	2.10	1.85	2.00
E. M. Diablo	1.85	2.10	1.85	2.00
Eureka	1.85	2.10	1.85	2.00
Eureka Tunnel	1.85	2.10	1.85	2.00
Eschbacher	1.85	2.10	1.85	2.00
Endowment	1.85	2.10	1.85	2.00
O and Prize	1.85	2.10	1.85	2.00
Golden Gate	1.85	2.10	1.85	2.00
Goodrich	1.85	2.10	1.85	2.00
Gould & Curry	1.85	2.10	1.85	2.00
Hale & Norcross	1.85	2.10	1.85	2.00
Head Center	1.85	2.10	1.85	2.00
Holmes	1.85	2.10	1.85	2.00
Independence	1.85	2.10	1.85	2.00
Julia	1.85	2.10	1.85	2.00
Justice	1.85	2.10	1.85	2.00
Jupiter	1.85	2.10	1.85	2.00
Jackson	1.85	2.10	1.85	2.00
Kentuck	1.85	2.10	1.85	2.00
Kossuth	1.85	2.10	1.85	2.00
Lady Bryan	1.85	2.10	1.85	2.00
Lady Wash	1.85	2.10	1.85	2.00
Leviathan	1.85	2.10	1.85	2.00
Leeds	1.85	2.10	1.85	2.00
Manhattan	1.85	2.10	1.85	2.00
Martin White	1.85	2.10	1.85	2.00
McClinton	1.85	2.10	1.85	2.00
Mono	1.85	2.10	1.85	2.00
Mexican	1.85	2.10	1.85	2.00
Mt. Diablo	1.85	2.10	1.85	2.00
Mt. Potosi	1.85	2.10	1.85	2.00
Noonday	1.85	2.10	1.85	2.00
New York	1.85	2.10	1.85	2.00
Northern Belle	1.85	2.10	1.85	2.00
North Noonday	1.85	2.10	1.85	2.00
Navajo	1.85	2.10	1.85	2.00
North Belle Isle	1.85	2.10	1.85	2.00
Ocidental	1.85	2.10	1.85	2.00
Ophir	1.85	2.10	1.85	2.00
Original Keystone	1.85	2.10	1.85	2.00
Overman	1.85	2.10	1.85	2.00
Oro	1.85	2.10	1.85	2.00
Paris	1.85	2.10	1.85	2.00
Potosi	1.85	2.10	1.85	2.00
Pinal	1.85	2.10	1.85	2.00
Queen Bee	1.85	2.10	1.85	2.00
South Bulwer	1.85	2.10	1.85	2.00
Savage	1.85	2.10	1.85	2.00
Seg Belcher	1.85	2.10	1.85	2.00
Sierra Nevada	1.85	2.10	1.85	2.00
Silver Hill	1.85	2.10	1.85	2.00
Silver King	1.85	2.10	1.85	2.00
Succor	1.85	2.10	1.85	2.00
Summit	1.85	2.10	1.85	2.00
Scorpion	1.85	2.10	1.85	2.00
Solid Silver	1.85	2.10	1.85	2.00
Star	1.85	2.10	1.85	2.00
South Nevada	1.85	2.10	1.85	2.00
Syndicate	1.85	2.10	1.85	2.00
Thoga Tunnel	1.85	2.10	1.85	2.00
Tip-top	1.85	2.10	1.85	2.00
Tuscarora	1.85	2.10	1.85	2.00
Union Con	1.85	2.10	1.85	2.00
Utah	1.85	2.10	1.85	2.00
Ward	1.85	2.10	1.85	2.00
Wales	1.85	2.10	1.85	2.00
Yellow Jacket	1.85	2.10	1.85	2.00

Sales at S. F. Stock Exchange.

Thursday A. M. Jan. 18	25 Yellow Jacket	1.15
1550 Albion	1.05	1.15
700 Argenta	1.05	1.15
200 Belcher	1.05	1.15
250 B & Belcher	1.05	1.15
400 Belle Isle	1.05	1.15
30 Bullion	1.05	1.15
200 Caledonia	1.05	1.15
100 California	1.05	1.15
500 Chollar	1.05	1.15
200 Con Virginia	1.05	1.15
200 Eureka Tunnel	1.05	1.15
200 Eschbacher	1.05	1.15
200 Grand Prize	1.05	1.15
50 Gould & Curry	1.05	1.15
825 Hale & Norcross	1.05	1.15
500 Independence	1.05	1.15
100 Justice	1.05	1.15
20 M White	1.05	1.15
675 Mexican	1.05	1.15
30 Northern Belle	1.05	1.15
10 Navajo	1.05	1.15
300 Ophir	1.05	1.15
50 Overman	1.05	1.15
420 Potosi	1.05	1.15
50 Pinal	1.05	1.15
200 Potosi	1.05	1.15
200 Scorpion	1.05	1.15
670 Sierra Nevada	1.05	1.15
100 Utah	1.05	1.15
200 Union	1.05	1.15
50 Ward	1.05	1.15

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Horn Silver, January 9th, \$15,000; Hanauer, 9, \$2,050; Park City, 9, \$2,400; Crescent, 9, \$2,020; Germania, 9, \$4,450; Stormont, 9, \$3,485; Horn Silver, 10, \$9,000; Horn Silver, 12, \$9,000; Hanauer, 12, \$1,880; Crescent, 12, \$1,750; Germania, 12, \$2,250; Horn Silver, 14, \$6,000; Park City, 14, \$2,350; Hanauer, 14, \$1,910; Germania, 14, \$1,000; Stormont, 14, \$2,780; Christy, 8, \$6,398; Standard, 8, \$31,724; Northern Belle, 8, \$16,473; Bouanza King (San Bernardino Co.), 11, \$19,000; Christy, 13, \$2,213; Northern Belle, 11, \$7,880; Bodie, 15, \$5,723; Star, 12, \$1,360; Yellow Jacket, 12, \$5,723; Bodie Tunnel, \$16, \$2,366.

JUDGE WHITE, of Pittsburgh, has declared nature dealings on margins as gambling, contracts immoral in character and pernicious in their tendency.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Albion Con M Co	Nevada	12	50	Jan 10	Feb 13	Mar 5	D B Chisholm	327 Pine st
Alpha Hy Grav M Co	California	4	10	Jan 8	Feb 15	Mar 7	E M Hall	216 Sansome st
Argenta M Co	Nevada	14	30	Jan 13	Feb 19	Mar 12	E M Hall	327 Pine st
Alta S M Co	Nevada	24	25	Jan 4	Feb 8	Feb 27	W H Watson	302 Montgomery st
California M Co	Nevada	18	50	Jan 3	Feb 8	Mar 1	W E Dean	308 Montgomery st
Con Imperial M Co	Nevada	44	50	Jan 10	Feb 15	Mar 8	A K Durbrow	309 Montgomery st
Gould & Curry S M Co	Nevada	12	25	Jan 11	Feb 12	Mar 5	W H Penfield	106 Leidesd. off st
Grand View Con M Co	California	1	05	Dec 11	Jan 14	Mar 7	J F Lightner	309 Montgomery st
Hale & Norcross S M Co	Nevada	7	100	Dec 2	Jan 12	Feb 7	W J Taylor	310 Pine st
Noonday M Co	California	7	100	Dec 2	Jan 12	Feb 7	W J Taylor	310 Pine st
N Noonday M Co	California	7	100	Dec 2	Jan 12	Feb 7	W J Taylor	310 Pine st
North Belle Isle M Co	Nevada	5	20	Nov 23	Jan 3	Feb 2	Q H Mason	331 Montgomery st
Ophir & Curry S M Co	Nevada	43	100	Dec 27	Jan 31	Feb 20	C L McCoy	309 Montgomery st
Oro M Co	California	13	15	Nov 11	Jan 19	Feb 10	W Stuart	420 Sansome st
Sierra Nevada S M Co	Nevada	75	100	Dec 8	Jan 11	Jan 30	E L Parker	309 Montgomery st
Utah S M Co	Nevada	42	160	Dec 7	Jan 15	Feb 5	G O Pratt	309 Montgomery st
Union Con S M Co	Nevada	21	100	Jan 10	Feb 15	Mar 5	J M Burroughs	339 California st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Atlantic Con M Co	Nevada	5	05	Dec 21	Jan 29	Feb 19	D Wilder	328 Montgomery st
Aurora M Co	California	4	05	Nov 23	Dec 22	Jan 20	P Conklin	585 Market st
Commonwealth Con M Co	Nevada	5	25	Jan 12	Feb 16	Mar 8	P M Barthard	311 Montgomery st
Con Amador M Co	California	4	50	Dec 21	Jan 26	Feb 10	F E Latham	310 Pine st
Entracht Gravel M Co	California	11	05	Dec 12	Jan 21	Feb 7	R N Brooks	239 Sansome st
Eschbacher W & M Co	Nevada	1	100	Dec 11	Jan 11	Feb 10	R N Brooks	503 Sacramento st
Estate Eucana Con S M Co	California	4	100	Dec 23	Jan 23	Feb 14	W J Stewart	215 Sansome st
Fair Villa M Co	Arizona	3	10	Dec 11	Jan 17	Feb 5	J H Sayre	330 Pine st
Horseshoe M Co	Arizona	3	02	Dec 27	Feb 2	Feb 23	J H Sayre	330 Pine st
Harrington M Co	California	4	15	Dec 6	Jan 9	Feb 7	C G Miller	409 California st
Mono L & E M Co	California	9	50	Nov 16	Jan 6	Feb 10	J Elbert	331 Montgomery st
Mount Auburn G M Co	California	9	25	Dec 5	Jan 9	Jan 25	C A James	402 Montgomery st
New Cosmo M Co	California	15	15	Dec 13	Jan 19	Feb 7	D B Chisholm	327 Pine st
Oro M & M Co	Arizona	2	20	Dec 28	Feb 3	Feb 27	J L Fields	309 Montgomery st
Pittsburg G M Co	California	15	20	Nov 29	Jan 3	Jan 24	R Weger	414 California st
Silver Cloud Con M Co	California	11	200	Dec 2	Jan 10	Feb 5	W J Taylor	310 Pine st
Red Hill H M & W Co	California	7	05	Dec 5	Jan 6	Jan 31	E Hestres	328 Montgomery st
Young America South M Co	Nevada	1	10	Dec 26	Jan 30	Feb 20	E M Hall	327 Pine st

MEETINGS TO BE HELD.

NAMES OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Betty O'Neal M Co	Nevada	R W Heath	318 Pine st	Special	Jan 23
Calaveras M Co	California	A D Paine	328 Montgomery st	Stockholders	Jan 23
Gila S M Co	—	J T McGehegan	318 Pine st	Annual	Jan 22
Pleasant Valley M Co	—	O E Elliott	327 Pine st	Annual	Jan 22
White Awake Pros & M Co	Arizona	O H Debrandt	cor Bush & Kearny st	Annual	Feb 14

LATEST DIVIDENDS—WITHIN THREE MONTHS

NAMES OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Bodie Con M Co	California	C W Sessions	309 Montgomery st	25	Nov 15
Bulwer Con M Co	California	W Willis	309 Montgomery st	15	Jan 12
Contention Con M Co	California	D O Bates	309 Montgomery st	25	Nov 23
Century M Co	Nevada	J W Pew	310 Pine st	10	Jan 19
Navajo M Co	Nevada	J W Pew	310 Pine st	25	Jan 12
Northern Belle M & M Co	—	Wm W Ellis	309 Montgomery st	50	Jan 15
Pleasant Valley M Co	California	O E Elliott	327 Pine st	05	Dec 15
Silver King M Co	Arizona	J Nash	315 California st	25	Jan 15
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	Jan 12

Mining Share Market.

The sudden disappearance of the Secretary of the Albion Mining Company with some of the funds of the mine has created a ripple of excitement in stock circles, but the fluctuation of stocks themselves have amounted to little. The Pacific Stock Exchange has this week sold its building, and will hereafter rent the premises instead of owning them.

The east crosscut on the 2,900 level of the Sierra Nevada, joint with the Union Consolidated, is now but fairly out of reach of the station, and far enough away to allow of heavy blasting being done. It has yet a long way to go to reach the point where should come down the ore streaks out above the winze.

The joint Mexican and Union Consolidated east crosscut on the 2,900 level shows a steady increase of quartz that carries metal. It will be some four weeks before it will hear the point where it is hoped to find ore.

The west crosscut on the 2,500 level of the Gould and Curry is being pushed at the rate of about 60 ft. per week toward the west wall, against, or in front of, which ore is likely to be found.

The following are the financial balances of the various mining companies on January 1st, so far as reported below:

Cash on Hand.—Alta, \$8,505.68; Best & Belcher, \$30,044.19; Benton Con, \$4,650.54; Bechtel, \$9,304.34; Belding, \$336.93; Bulwer Con, \$15,372.30; Bodie Con. (bullion on hand, \$4,302.88); \$25,928.32; California, \$33,993.94; Con. Virginia, \$104,201.90; Chollar, \$29,278.06; Crown Point, \$20,886.03; General Jackson, \$830.98; Gould & Curry, \$17,642.40; Hale & Norcross, \$19,479.19; Lady Washington, \$1,179.58; Mexican, \$45,064.92; Mount Diablo, \$3,075.38; Northern Belle (unsold bullion on hand, \$152,400.50), \$34,418.11; Ophir (bullion on hand, \$15,744.04), \$1,336.81; Oro (indebtedness, \$3,953.14), \$98.05; Occidental, \$6,983.09; Potosi, \$23,255.50; Savage, \$29,872.29; Scorpion, \$107.62; Standard, \$91,581.14; Union, \$6,700. Indebtedness.—Argenta, \$2,883.79; Betty O'Neal (overdraft), \$7,050.67; Grand Prize, \$3,970.99; Mono, \$1,587.80; Sierra Nevada, \$7,485.70; Star (old indebtedness, \$36,839.84), \$34,170; Utah, \$6,543.38.

THE HYDRAULIC ELEVATORS in use in this city in which a long piston, fitting on a cylinder sunk in the earth, carries the cage on its upper end, were invented originally by M. Leon Edoux, of Paris, France. Elevators of this kind were shown in operation at the Paris Exposition of 1867. Several minor improvements have been made since the original invention. This style of elevator is now very popular in this city. Those in the Huuington, Hopkins & Co.'s building, on Market street, which were put in by the California Machine Works, are noticed by many passers. These works also put elevators in the Buai B'rith hall, Eigenbaum & Co.'s, the Sub-Treasury and other buildings,

Meetings and Elections.

BLACK DIAMOND COAL CO., Jan. 15th. President, P. B. Cornwall; Directors—Thomas Bell, P. B. Cornwall, J. B. Haggan, A. Hayward, S. P. Smith. James H. Robinson, Secretary.

BELLINGHAM BAY COAL M. CO., Jan. 15th. Directors—Thomas Bell, P. B. Cornwall, J. B. Haggan, A. Hayward, S. P. Smith. At a subsequent meeting of the newly-elected Board, P. B. Cornwall was elected President and Jas. H. Robinson Secretary.

He ordered the discharge of about 35 men altogether, leaving but 16 miners now at work. As near as the facts can be ascertained, this was simply to reduce expenses pending the erection of the mill. All accounts agree that the mines present the best showing of any in the county, there being about 1,000 tons of ore on the dumps, and enough in sight or so well opened that a hundred men could be put to breaking down ore whenever it is wanted. There have been a series of delays in getting in the machinery for the mill, which is reported as being still at Mojave, but the carpenters have received some timbers, and are going ahead with their work.

MARIPOSA.

CONCENTRATORS.—*Gazette*, Jan. 13: The Yosemite mill at No. 9 mine has again started up, after an interval of three weeks for repairs and the addition of 12 Frue ore concentrators, chlorination works are also being erected. The Mt. Gaines mine, in connection with the No. 9, has again resumed the usual din and bustle of vigorous business activity. The Quartz mountain mine, under the management of Messrs. Webber & Rodgers, is temporarily closed.

MONO.

BODIE CON.—*Free Press*, Jan. 16: During the past week 135.6 tons of ore were hauled to the mill and 135.7 tons were crushed. The average assay value of the pulp was \$48.45 per ton, that from the sacked ore being \$271.84, and the average value of the tailings was \$7.03. The bullion shipment was valued at \$5,723.23. There were 201 carloads of ore hoisted from the mine, of which amount 27 carloads were from the stopes at the 740 level of the shaft, and 64 loads were extracted from the workings between the 640 and 780 levels. Stopes will soon be opened from the 770 shaft level, where the vein has been reached by the short east crosscut showing good ore.

STANDARD CON.—There were extracted and sent to the mills last week 1,427 tons of ore, and \$25,572.60 were shipped to the company in San Francisco. The east crosscut, 1,000 level, was advanced during the week 12 ft; total length 1,109 ft. The rock in the face is hard and shows no change. The east crosscut from the south drift is in 202 ft; progress since last report 18 ft.

BULWER CON.—The south drift from the west crosscut, 600 level, has been extended since last report 10 ft; total length 366 ft. There is no change in the appearance of the ground cut through, which is hard and shows some quartz.

BODIE TUNNEL.—The mill is kept supplied with ore and the stopes look well. There is no change to report in the formation.

NEVADA.

THE MASCOETTE.—*Grass Valley Union*, Jan. 13: Work on the Mascotte quartz claim is progressing under the superintendence of Mr. George Murphy. A perpendicular prospect shaft has been put down to the ledge, some 20 ft, where both the foot and hanging walls are found smooth and regular, and the vein having a pitch of 74 degrees. The shaft is being carried down from this point on the pitch of the vein to water level, which is 4 by 8 ft inside of timbers and lined throughout with planking, and will be divided into two compartments, one for car track and the other for pump and ladder way. The shaft is also to be carried up to the surface on the same incline, and timbered in the same manner, and then, when the hoisting works, which are in process of construction are completed, the work of sinking the shaft below water level will be vigorously prosecuted. The probabilities are that the Mascotte will open out into a strong vein, as the space between the walls containing the ledge and ledge matter is between 4 and 5 ft.

MORE OF THE LITTLE BONANZA.—*Nevada Transcript*, Jan. 13: H. B. Nichols and E. B. Russell's quartz mine is still panning out well. In the last three days \$700 worth of gold has been taken out. The drift yields \$100 worth of gold to the foot and gives about \$1.75 to the pan. The shaft is down to water level and in the hard rock below the water gold can be seen. We were shown a lump of gold taken out to-day which is worth \$25 by weight.

PLUMAS.

CRESCENT MINE.—*Greenville Bulletin*, Jan. 10: On Monday evening a clean-up was made at the Crescent mine after a 4 days' run with 4 stamps, and the result was \$4,000 worth of bullion. The ore body opens out better every day. The Taylor-Plumas mill is almost completed; little more than laying the water-pipe remains to be done. The Green Mountain mills are both running steadily, and have been yielding better during the past week or two. The 3 mines are located in the form of a triangle, the Crescent being down on the flat at the foot of the mountain, the Taylor-Plumas about 250 yards northwest and the Green Mountain about 500 yards southwest, and up the mountain. The main lode is consequently tapped at a greater depth in the Crescent mine than in either of the others, and as it is the uniform experience there that the ore is richer as depth increases, so doubtless it will be with both of the other mines. The present workings of the Green Mountain at their greatest depth are several hundred ft above even the surface ground of the Crescent mine.

SPANISH PEAK.—*Plumas National*, Jan. 13: From Mr. M. Matheson, who has been in the lower country for some months, and who called on us the other day, we learn that there is good reason to believe that capitalists will in the early spring take hold of the Monte Christo property, and push the prospecting tunnel ahead. There are many good miners who yet believe that there is a magnificent gravel mine in that mountain, and if Mr. M. is correct the fact will yet be demonstrated. We hope the work will be resumed, for we have never lost faith in the property, and believe that it only needs muscle and money to show it up among the best drift mines in the State.

INDIAN VALLEY.—The new air compressor has been received at the Indian Valley mine; the whole machinery belonging to it is on the ground. Mr. Manson is expected back from San Francisco this week, and when he comes he will at once proceed to erect the machine and get it to work.

SHASTA.

THE AFTERTHOUGHT MINE.—*Redding Independent*, Jan. 13: A. J. Loomis, of Red Bluff, who is interested in the Afterthought mine at Furnaceville, in this county, tells the *Enterprise* that under the management of J. O. Stewart the mine is likely to be a complete success. Mr. Stewart has a new pro-

cess of extracting copper and silver from the dirt, and it is working to the entire satisfaction of the superintendent and owners. He is taking out about 1,000 lbs of pure copper daily, and expects to take out a ton daily as soon as two more stamps are put up in working order. The copper taken out has been from dirt around the mine that was considered valueless, or nearly so, by those who worked the mine several months since. If the refuse dirt is yielding so satisfactorily, then the company may reasonably expect good results when the best of pay ore is handled.

SIERFA.

BONDED.—*Mountain Messenger*, Jan. 13: The Phoenix quartz mine, at Sierra City, has been bonded to Eastern capitalists, and they are proceeding with its development.

A report reaches us that Jack Billings has struck a large deposit of rich gravel in his diggings at Sebastopol. Our informant was of the opinion that he had reached the main tunnel.

TRINITY.

LUCKY ESCAPE.—*Trinity Journal*, Jan. 13: Bartlett & Evans have a new 600-foot bedrock tunnel in their mine at Red Hill, through which water was running last Saturday, when it suddenly dammed up at the head. Three men, Pat Lawton, John Dacy and John Lumly went up through the tunnel to see what was the matter, and about the time they got to the dam it broke and the rush of water washed two of them the entire length of the tunnel and safely deposited them on the dump, the third man clinging to the side of the drift and avoiding the free ride. Fortunately none of the men were injured aside from some slight bruises.

A LITTLE WATER.—The storm of last week started the water in the mines and that was about all. More storm is needed at once, as there is so little snow on the hills to keep up the supply.

TUOLUMNE.

THE PATTERSON MINE.—*Tuolumne Independent*, Jan. 13: Supt. W. F. Drake is making a splendid property of the Patterson mine, and the company, which is made up of strong and willing men, have been lavish in their expenditure to carry out the well-framed plans of the master workman. So pleased with the results of his stewardship, the Trustees East have wired that he had been elected superintendent with sole charge. The new mill is running 20 stamps. From an experienced miner employed, we understand that everything is looking splendid—the deeper they sink the better the ore. A new chute of ore has been struck in the shaft which shows gold freely—vein 6 ft and gold better quality. The No. 3 levels just opened are in good ore of higher grade. Had a splendid clean-up last month—and returns are better each month by almost double. By like good management other mines now lying idle in this county could also be worked to good profit.

NEVADA.

WASHOE DISTRICT.

OPHIR.—*Enterprise*, Jan. 13: The broken spur-wheel will be repaired by to-morrow. The accident has delayed no work at the Union shaft, nor did it interfere with the pump, and the water has been handled without difficulty by apparatus other than that affected by the breaking of the wheel. The sump in the joint Mexican winze below the 300 level will be completed to-day.

SIERRA NEVADA.—On the 2700 level the east crosscut is making good progress. It will be in ground in about two weeks in which a change may be looked for. On the 2900 level the joint Union Con. east crosscut is being pushed forward as rapidly as possible.

UNION SHAFT.—All the new pumps have been lowered to the levels on which they are to be set up. As soon as all is in readiness for the change, the old pumps will be lifted from their foundations and the new ones put in their places, beginning with the lowest, that on the 2700 level. The breaking of the spur-wheel at the Ophir caused no delay, nor will it cause any.

UNION CON.—The joint Sierra Nevada east crosscut on the 2900 level is making good headway. Being now well out from the station, blasting may be pushed. The joint Mexican east crosscut on the 2900 level is passing into ground showing more quartz than was first seen.

YELLOW JACKET.—The old upper levels continue to yield about 60 tons of ore per day. On the Sagebrush level there is found to be an immense area of ore that would yield about \$9 per ton, but at the present cost of extraction and reduction nothing can be done with this. In addition to the work done in taking out ore now prospecting is being done, and deposits of ore now hidden may be brought to light.

MEXICAN.—The joint Ophir winze has been sunk 12 ft below the 300 level for a sump. This sump will be completed to-day. A station will now be opened at the 300 level, and a crosscut started east in the vein. The bottom of the winze shows an increase of quartz.

CHOLLAR.—The south drift has passed into mineral-bearing quartz, giving low assays. The drift is fast nearing the Potosi line. At present the trend of the lode is toward the east, which causes the drift to cut into it deeper than heretofore. The chances are good for finding something of value down about the north line of the Potosi.

ALTA.—The drain drift to connect with the Suro tunnel on the 1030 level is being advanced at a rapid rate. It is now out over 250 ft. The completion of this drift will give new life and capacity to the pumps, as it will at once relieve them of the great strain of the dead weight of a column of water 1,030 ft in height.

SAVAGE.—The joint Hale & Norcross north drift on the 2600 level is being pushed along at the rate of about 30 ft per week in ground of promising appearance, though rather soft for rapid progress, as close timbering is required. Quartz feeders giving low assays are beginning to be cut.

CON. VIRGINIA.—The south drift on the 2700 level is being advanced at the usual speed. The face continues to show quartz giving low assays. All the hoisting of men and rock is now being done at the C. and C. shaft, pending the changing of the pumps at the Union shaft.

CROWN POINT.—Large quantities of ore still being taken out. This is of a very low grade—averaging but about \$11 per ton—but its extraction gives employment to a great many men, who would otherwise be idle, and keeps the mine and all connected with it in good repair.

SCORPION.—The usual progress is making in the main east drift on the 500 level. The material is still vein matter, which looks about the same from day to day. The drift already shows the lode to be of immense width at this point.

GOULD AND CURRY.—The west crosscut on the 2500 level is being rushed along at the rate of about 60 ft per week. It is in vein porphyry streaked with quartz and seams with clay.

HALE AND NORCROSS.—The joint Savage north drift on the 2600 level is progressing at the rate of about 30 ft per week. The material is a mixture of quartz, clay and porphyry.

BULLION DISTRICT.

COPPER.—*Elko County Free Press*, Jan. 13: At Bullion, which is also known as Railroad district, they are still pegging away, and with no inconsiderable success. The Blue Bell Company a short time since completed a run of 500 tons of carbonate ore in their furnace. There is no longer room for doubting that the old Empire City mining company's property has changed hands, and now belongs to Mr. Riley and friends. They are said to have a large quantity of galena ore in sight. At the Sweepstake mine a fine breast of ore can be seen, which assays from 25 to 40 per cent. copper and carries \$80 a ton in silver.

COMET DISTRICT.

NEW DISCOVERY.—*Pioche Record*: Great tales are told on the streets of a wonderful discovery recently made by Jim Burrows in what he calls Comet district. This new find is located on the west side of the Highland range, about 10 miles due west of the Floral Springs. Several samples of rich ore, which assays in the hundreds, have been brought to town, and if it is anything like the description that disinterested parties have given us, they getting their information from Burrows, indeed Jim is a most fortunate man, and he has more rich ore on top of the ground than the trains of Vanderbilt and Gould would be able to haul for the next 50 years. There is nothing like being lucky.

EUREKA DISTRICT.

GEDDES & BERTRAND.—*Eureka Sentinel*, Jan. 12: A representative of the *Sentinel* had an interview yesterday with Mr. Atchison, foreman of the Geddes & Bertrand mine. He tells us that they have just made a shipment of 18 bars of bullion, 980 fine, valued at \$1,000 each approximately, to the reduction works of Selby & Co., San Francisco. The mill is reducing about 54 tons daily, the average assay value of which is 28 ozs, for which they got, in December, \$7.13 1/2 per ounce, or about \$32 per ton. This, Mr. Atchison says, is about the average yield at present, \$36,000 per month of 30 days. The total expense of running mill and mine is \$8,000 per month, leaving thus a net profit of \$28,000 for the month.

PEAVINE DISTRICT.

BULLION.—*Virginia Enterprise*, Jan. 9: The Antelope mine, in Peavine district, has just shipped 5 bars of bullion to Boston. The mine is being worked by Boston folks.

TUSCARORA DISTRICT.

BULLION SHIPMENT.—*Times-Review*, Jan. 9: Navajo made its regular bullion shipment of 8 bars this morning, aggregating \$15,182.50.

NORTH BELLE ISLE.—Everything is looking well in this mine. The boiler has been repaired, and this morning the work of sinking was resumed, and the men returned to the places which they occupied before suspension.

WHITEWASH.—On the hills near the Navajo is found a very curious deposit, apparently hundreds of feet in extent. It is a white substance resembling marl, but when mixed with water makes a superior article of whitewash. It hardens immediately, is pure white, leaves a good coating, and will not rub off like ordinary wash made of lime. It makes a beautiful finish. An experiment with the material was tried on the ceiling of Cockbin's barber shop.

AT THE GRAND PRIZE.—Since Friday last workmen have been engaged in putting in place the plunger at the bottom of the Grand Prize shaft, which job was completed and all connections made at 4 o'clock this morning, and the pump set in motion. Although the pump is running only 7 strokes per minute, at the time of our going to press it had emptied the shaft of some 60 or 70 ft of water which accumulated therein, showing that it was equal to any emergency. The work of hoisting waste, of which there is a great accumulation in the drifts, will now be resumed, and the work of exploration vigorously pushed forward. The west drift from the 700 level, now in some 52 ft, and which was suspended from fear of encountering a greater flow of water, will now be driven ahead. The saving in expense of running the Prize, now that the steam pump has been discarded, will be \$200 per day, or about \$6,000 per month.

ARIZONA.

SMELTER.—*Phoenix Herald*, Jan. 12: By the 1st of April the mining interests of Phoenix will receive an impetus by the erection of a good-sized smelter on one of the copper mines of Castle Creek, and the erection of a 40-stamp mill on one of the Cave Creek mines. The latter, we are credibly informed, will be put up during next month, or at least the business of putting it up will begin then. The energetic work being done in both the sections of country named will ere long bring yet other mills and smelters into this region of country, where they will find almost limitless work and ample remuneration.

NOTES.—*Tombstone Epitaph*, Jan. 10: The early morning of the 1st inst. saw many persons on the hills in this district relocating claims. Many had their pains for nothing, but we hear of one fortunate man who had the hardihood to relocate a well-known claim and cleaned up a few days later with \$1,500 for his night's work. We hear of some copper mines having lately been discovered in the vicinity of Co-chise's stronghold which promise well. We have also seen some very fine looking rock from a claim near Morris' wood ranch. The last year, however, has been a quiet one in this district. Most of the claim owners simply kept up their assessment work, and others have relocated their properties to hold on for another term. Col. Hafford, with his usual luck, is the owner of a claim from which he has lately taken some samples which assay 20 per cent. copper and \$64 in silver. His claim is situated 10 miles southeast of Picacho, in Pima county. The Copper Queen broke a shaft of one of their blower engines, and consequently had to shut down one of their smelters. Ben. Williams, the superintendent, is in town, and by his energy has done much to repair the damages reported. The Pinal Con. mining company, at Butte

City, Pinal county, under the able management of Aaron Mason, superintendent, is now shipping bullion. The smelter works splendidly. The Santa Catarina mine, Pima county, has developed a rich vein of copper ore. At the depth of 40 ft a vein of 6 inches of almost pure metallic copper was struck. There is over 1,000 tons of from 18 to 20 per cent. in sight. Blue Monday and Enlie show signs of returning and replenished vitality.

IDAHO.

THE WOLFTOSE LEDGE STRUCK IN DEPTH.—*Wood River Times*, Jan. 13: Another rich strike is reported in the Wolltose mine, on Deer creek, in the lower drift. Last Monday the ledge came in strong, and from 2 to 3 ft in width—of rich carbonate and galena ore. The dip of the vein, which has heretofore been to the west, has changed to the east, and the ledge now pitches into the hill. The miners are going after it lively. This new strike is under the original discovery, and is very encouraging as indicating the continuance of the ore chimney in depth.

A RECENT STRIKE.—Capt. Hledsoe, superintendent of the Penobscot mine, was in town yesterday, and reported that ore was struck last Saturday in tunnel No. 3, the lowest workings in the property, and at a depth of 150 ft from the surface. The heading had been in ledge matter for over 100 ft, cutting through fine looking vein matter, but early Saturday morning ore appeared in the breast. It proved to be only a stratum 3 inches thick, but this was followed by two other strata of like thickness, and the mere finding of ore at that depth is held to be an exceedingly promising indication. The Penobscot is controlled by Judge V. Stamps Anderson, of this city, and is located about 6 miles from Hailey, on the same ledge as the Minnie Moore.

MONTANA.

MINE SOLD.—*Inter Mountain*, Jan. 13: About 3 months ago Green Campbell, of Utah, and C. N. Larabee, of this city, bonded of W. J. McNamara and James Larkin a two-thirds interest in the Mountain View mine for \$20,000. The remaining third was owned by C. N. Larabee. Since that time the property has been actively explored, and the showing of the mine so rapidly improved that its purchase was decided upon long before the bond expired. On Saturday last the necessary deeds were drawn up, transferring a two-thirds interest to Messrs. Campbell and Larabee. The mine adjoins the St. Lawrence on the northeast, and if it should prove to be an extension of that magnificent ledge, it is worth 10 times the amount paid for it. The mine is developed by a shaft 200 ft deep, from the bottom of which considerable exploration has been conducted. It is exclusively a copper mine. . . . The Colorado smelter is reducing about 50 tons of ore per diem.

The Clear Grit continues to develop handsomely in the 220 west level. The Alice company is paying to-day. About \$50,000 will be disbursed. Seventy-five mineral locations have been recorded during the past week in this district. Mechanics are still at work on the mammoth machinery at the Anaconda, which will not start up for 10 days. The Stedfeldt furnaces at the Lexington mill are giving excellent satisfaction, the percentage of chlorination being uniformly high.

NEW MEXICO.

PERCHA DISTRICT.—*New Mexico Mining World*, Jan. 3: The Carpenter district, on the opposite side of the range from Percha, is being prospected, and some good finds reported. Almost pure silver is still being taken out of the Solitaire mine, in the Percha district. Unless the ore runs out, this mine will prove to be one of the richest ever discovered. The town of Kingston is very quiet, notwithstanding the great activity in the mines. Considerable development work is being done all through the Percha district, and the people of Kingston are expecting a big boom in the early spring. The 10-stamp mill at Hillsboro is doing a big business. It is crushing about 20 tons of ore per day. About 3 carloads of ore are shipped every week. The Animas mining district, 15 miles northeast of Kingston, is reporting some very good strikes. The Bullion mine, near Kingston, has a true fissure vein, the ore running about \$250 to the ton. Kingston, named from the Iron King mine, and its surroundings, mines and prospects, is situated on the strike of the grand mineral belt of the Membras mountains, or Black Range, and gives great promise of being a camp of continuous productiveness. The first rich mineral in the district was found on the Solitaire mine last August by Jack Shadden, the discoverer of the famous Robinson mine in Colorado. The claim had been located, in 1881, by H. J. Wilson. Shadden, not knowing of a prior location, took possession of the mine and bonded it to Tabor and Wurtzback for \$100,000.

UTAH.

BULLION.—*Salt Lake Tribune*: During the week ending January 6th there were shipped from Salt Lake 19 cars of lead, 458,212 lbs; 2 cars copper matte, 40,700 lbs, and 51 cars bullion, 1,161,497 lbs, making a grand total of 72 cars, aggregating 1,660,409 lbs. This is a good beginning for the first week in the new year.

CRESCENT.—Mr. Daily, superintendent of the Crescent mines, reports the daily average output from the property at about 30 tons. This ore is hauled to the sampling mill on runners. There is no more snow at Rebellion mine than there was one month ago.

HIDDEN TREASURE.—Capt. Wilder is running a long and deep tunnel for the benefit of the Hidden Treasure property in Dry canyon. This was a great producer for several years. Work on the new smelters of the Mammoth is being pushed energetically.

SALES.—More mining sales are pending in Utah at present than at any time in the past two years. This is by reason of the big output of ore and bullion in 1882, and the favorable mining outlook in nearly every district in the Territory.

TINTIC is now one of the liveliest mining districts in Utah. A great deal of money is being spent in development, and the output of ore is larger than ever before.

SEVERAL old and supposed to be worked out mining camps in Nevada have lately come to the front. Conspicuous among them are Tuscarora, Austin, Conio, Jefferson and Ophir Canyon, which are now exceeding their palmy days in bullion production.

Denver Exposition—No. 23.

Editorial Correspondence.
Pima County, Arizona.

Pima county is said to be the oldest mining locality in the United States. The early Jesuit missionaries and their immediate associates were engaged in mining operations at quite a number of different points in this county something like 250 years ago. From the many old shafts and tunnels which are yet to be seen, it is evident that mining was carried on then quite extensively. It was within the present boundaries of this county that the famous "Planchas de Plata"—"planks of silver"—were found, which are said to have yielded five tons of pure metal. It lies directly west of and adjoining Cochise county. Its valleys contain quite an extent of fine grazing land, while its mountains are rich in minerals.

The construction of the Southern Pacific railroad has imparted a wonderful impetus to the mining and other industries of this county, as it has, indeed, to the entire Territory, and especially to the southern tier of counties, through which it passes. The county is divided into 13 mining districts, and millions of dollars have already been invested in opening their numerous mines. Harshaw district contains one of the leading mines of the Territory—the Hermosa. The ore is chloride, and is worked by a 20-stamp mill. The yield to date is about \$700,000. It has been opened to a depth of over 300 ft. The Trench, one of the old Spanish mines, is opened to the depth of 400 ft. with steam hoisting works. The Hardshell, Alta, Blue Nose, American and Independent are among the mines of this district.

Washington Camp district contains many large veins of low grade ore, but generally carrying a large per centage of lead. The Belmont is one of the oldest locations in the district. It has quite a heavy vein of carbonate ore. The "Old Mowry" mine is one of the most noted of the district. It was worked before the war by Lient. Mowry, and gave employment to some 400 men, mostly Mexicans. Large smelting works were erected, but the building and machinery were all destroyed by the Apaches. The main shaft is down 350 feet. The mine is now owned by parties in Tucson. There are mines enough in this district to make it one of the leading districts in the Territory.

Tyndall district boasts of quite a number of mines with promising prospects, but it is claimed that the district has suffered much from bad management and unscrupulous speculators.

Arivaca district contains a 10-stamp mill, with steam hoisting works upon the Con. Arizona. This district also contains the famous Cerro Colorado mine, which is said to have yielded some two millions of dollars before the war. The works were all destroyed by the Apaches, and have not been since rebuilt. The mine is now owned by the Arivaca M. and M. Co. To the west of Arivaca is the Baboquivari range, which is said to contain several valuable mines worked by the early Spaniards.

Oro Blanco district contains several valuable mines, yielding chiefly carbonates and free milling ores—gold and silver. The Warsaw mine has produced some \$30,000, and has a 10-stamp mill with roaster. The Yellow Jacket also has a 10-stamp mill. The Empire district, some twenty miles east of Tucson and just south of the line of the Southern Pacific railroad, has recently become somewhat prominent by the discovery of the "Total Wreck," said to be an immense body of chloride ore, 50 feet wide. A large amount of ore has been raised, and reduction works are soon to be or are already in process of erection. We have no room for mention of other prominent mines and districts.

Copper.

Pima county also contains several valuable mines of copper—veins are reported 50 feet in width, with very rich ores of carbonates, oxides and glance. A 30-ton smelter has just been erected by the Huachilacha Company.

Yavapai County

Is the largest in area in the Territory. It also maintains a prominent position as a bullion producer. It is the leading county in the production of gold, which occurs both in placers and in ledges. Silver and copper are also found in many localities in almost all the various forms of their ores. The first mining discoveries in the county were of gold, and made at Weaver Creek, at which point mining has been successfully carried on up to the present time. Peck district, some thirty miles southeast of Prescott, has produced a large amount of bullion. The Peck mine, in this district, has produced over \$1,200,000 since its discovery in 1875. Ore of extraordinary richness is sometimes met with in this mine, which has been opened to a depth of over 400 feet. The ore is worked by a 10-stamp mill and roasting furnace.

The Tiger, a silver mine in Tiger district, near the above, is one of the largest veins in the Territory—70 feet between walls. It is opened to a depth of over 300 feet, and is equipped with steam hoisting works and a 10-stamp mill. It has thus far produced \$250,000. It is a true fissure vein, and quite a number of extensions have been located. Several valuable mines have been opened in the Bradshaw basin, in this district, yielding gold chiefly. A 10-stamp mill is located there.

In the Tip-top district, 50 miles southeast of Prescott, there are a great number of promising mines, several of which are paying regularly.

A 10-stamp mill and roaster have been erected for working the Tip-top mine, the principal one in the district, which has already produced over \$1,000,000. There are one or two other mills in the district erected for custom work.

The Hasayampa district is located about 10 miles south of Prescott, in a heavily timbered, well watered region, which is considered one of the most delightful summer resorts of the Territory. The creek from which the district takes its name has been worked for gold ever since the first settlement of Arizona by the people of the United States. It is essentially a gold producing district. But as depth is reached in the mines the gold gradually decreases and a large percentage of silver comes in, much as on the Comstock lode, at Virginia City, Nevada. The Senator has been quite extensively worked, and has thus far yielded about \$175,000. It has a 10-stamp mill. The Crook, near by, has produced some \$50,000. There are at least 30 or 40 other mines in this district well worthy of mention.

Walker district, seven miles east of Prescott, embraces the head waters of Lynx creek, the richest gold-producing stream yet discovered in the Territory. Upwards of \$1,000,000 have been already taken from it since its discovery, in 1863. The district abounds in valuable mines of both gold and silver. The Turkey Creek and Big Bag, Grover Creek and Cherry Creek districts, all in the immediate vicinity of Prescott, are well watered and well wooded localities, containing rich mines, the most of which are as yet but slightly developed, but many of which in the near future bid fair to become valuable. The attention of Eastern capitalists is now being attracted to this neighborhood.

Weaver district is one of the oldest mining localities in the Territory. From a small depression upon the summit of Rich Hill \$500,000 in coarse gold was taken, mostly lying upon the bed-rock near the surface. About the same amount was taken from the three or four gulches running down from this locality—\$1,000,000 in all. A 300-ft. wide gold-bearing quartz vein lies near this locality, upon which there are about 200,000,000 tons of quartz in sight within 100 ft. from the surface. Good, and sometimes very rich, milling rock is assorted from this immense quartz deposit. Upon the Model mine, in the same district, a Huntington mill has been erected. Of the Tonto Basin Silver Mountain, Walnut Grove, and other districts, we have no space for mention. The Silver Belt silver mine, 16 miles east of Prescott, has a smelting furnace of seven tons capacity which has already turned out over \$100,000 in silver. The Wickenburg and Zika mines, in Black Canyon, are each worked by arrastras to good profit.

Yavapai county is also rich in copper ores, which are found in all parts of the county. The only mines, however, which have been thoroughly opened are those in the Black Hills, about 20 miles northeast of Prescott. An Eastern company has recently purchased the Eureka, and has made arrangements to erect reduction works upon it.

Pinal County—Silver King.

Pinal county has become quite well known through the wonderful developments at the famous Silver King mine, which may now be considered, whether in size of the vein, richness and variety of its ores, or in the aggregate of the bullion yield, one of the great mines of the world. We have already spoken of the rich and elegant exhibit which this mine made at Denver. The croppings of the Silver King were found upon a low conical hill near the center of a basin surrounded by spurs of the Pinal Mountains. This mine was discovered by a discharged soldier, who, with his associates, after working it for two years, taking out several thousand dollars, sold it to some San Francisco and Oakland capitalists, who still continue to work it. The vein matter is chiefly quartz, and the ore a sulphuret carrying native silver, copper glance, antimony and other combinations. It forms one of the richest bodies of silver ore ever discovered. The main shaft is now down over 600 ft., with five levels—shaft and levels everywhere showing fine ore, which in places is proven by crosscuts to be 80 ft. wide. The ore is worked by a 20-stamp mill, at Pinal, five miles distant from the mine. There are also roasting and concentration works. The ores are treated by the lixiviation process. The extensions both upon the north and south are being developed by the aid of steam hoisting works. The Belcher, in the same district, is a promising mine, with a 10-stamp mill. The proprietors of the Eureka, upon the same ledge, were about making arrangements a year ago to put up a mill. A custom mill has already been put up, or soon will be, at the mouth of the San Pedro, to work several prominent mines in that neighborhood.

Copper is also found in this county, and a 30-ton smelter is in successful operation on the Gila river, near Florence, treating ores from a group of mines in the foothills some five miles distant.

Gila County.

This is said to be one of the most thoroughly mineralized counties in the Territory, containing gold, silver, copper, lead, coal and iron. An expedition of nearly 300 men, led by the Governor, penetrated into this county, then an Apache stronghold, in 1871, in search for placer gold. In their unsuccessful search for that they overlooked the really rich mines of silver and copper which they passed over. The Indians for a long time guarded well the treasures which they know were hidden within their mountain homes; but the strong arm of the white man finally prevailed, and the now fa-

mons Globe district, in this county, was opened up to industry and commerce. Hundreds, if not thousands, of tons of rich ore has been freighted to San Francisco for treatment from this district. A large number of mines are now opened. Two 10-stamp mills and one 5-stamp mill are now in operation in the district, respectively on the Miami, the Champion and the Townsend mines.

The Richmond Basin, in this county, has become famous for the silver nuggets which have been picked up there—over \$80,000 have been picked up from the surface in the vicinity of a single camp, near which is now the McMorris mine, which has yielded to date about \$625,000. The mine is provided with steam hoisting works and a 10-stamp mill. There are several other valuable mines in the same neighborhood.

The McMillenville group of mines, 20 miles north of Globe, are located upon an immense fissure, traceable for twelve miles across the county, one of which—the Stonewall—is well known in this city from the rich specimens which it has produced. It is now provided with a 5-stamp mill and steam hoisting works. It has yielded, to the present time, considerably over \$300,000.

Copper mining in this county promises to become an important business. It contains some of the richest in the territory. The Globe, the first opened, is now consolidated with several others, upon which three furnaces have been erected, with a united capacity of 100 tons per day. The bullion is shipped to Baltimore, and pays from two to three hundred dollars per ton in silver. The daily bullion production is about four tons. Gen. A. McDowell, of Chicago, is one of the principal owners and the earliest promoter of this group of mines; he is reaping a rich return from his investment.

Mohave County.

This county is located on the central portion of the eastern border of the Territory. It is a mountainous and exceeding rich and abundant in mineral bearing veins. Almost every mountain range appears to be seamed with mines rich in silver, gold and copper. Much of the county abounds with wood and water. Nearly all the ore obtained is picked rock, which is shipped to San Francisco at great expense for treatment. There are but two or three small mills in the county; but as soon as the Atlantic and Pacific railroad makes its connection through from Albuquerque, in New Mexico, to the Southern Pacific, at Mohave, a new impetus will be given to the mines of this county. The same advantage will also accrue to all the mineral range of country through the entire length of the northern portion of the Territory. The famous McCracken lode, which extends for miles across the country, is located in this county, and with the opening of the railroad will begin, with other neighboring mines, to send large amounts of bullion to this market. The McCracken Consolidated Company has already expended \$200,000 in improvements, and realized over \$800,000 in silver from its mines. The company is now running a 20-stamp and a 10-stamp mill.

Yuma County

Occupies the southwestern corner of the Territory. It has long been known to be rich in gold placers, and is comparatively convenient of access from the Southern Pacific railroad, which passes directly through the county. Mining was first commenced here in 1862, and in 1863 fully 2,000 miners were working the placers in the foot hills near La Paz, about 70 miles north of Yuma, who soon took out a million and a half of gold. The mines of Castle Dome district, 20 miles north of Yuma, were discovered in 1863 by Prof. Wm. P. Blake, a well known geologist, for many years a resident of this city. There is a large group of mines in this district which although yielding a low grade of ore, are nevertheless among the most profitable in the Territory. It is estimated that the district has yielded fully \$2,000,000. Silver district is also one of the leading camps of the county. It is convenient of access, and contains some of the heaviest ore bodies in the Territory. The Red Cloud, a New York company, has, perhaps, the largest development. It has yielded over \$100,000. Its ores are treated at its own works—a 20-ton furnace. The Ellsworth district is a promising locality—has many promising mines. The Oro mine has a five-stamp mill. Messrs. Thomas Eells and Richards, of this city, are opening a very promising mine in this district.

Maricopa County.

East of Yuma, though generally considered an agricultural county, has many promising mines. The well-known Vulture mine is located in this county. This mine has produced \$3,000,000. It has been opened only to a depth of 400 ft. It is a very heavy mine, showing a width at one place of fully 100 ft. The ore is now reduced in an 80-stamp mill, at a cost of only \$2.50 per ton. More stamps will soon be added, and the bullion product be increased. The Golden Star, on Cave creek, is a promising mine, and has a 10-stamp mill. A 5-stamp custom mill is also in operation about four miles from Phoenix, run by water from the Grand canal.

Graham County

Is the youngest born of the Territory, but the richness, extent and variety of its minerals is fast giving it great prominence as a copper and bullion producing locality. Graham can probably show some of the most productive copper mines in the United States. The famous Longfellow mines are located on the San Francisco river, in this county. Before the opening of the South-

ern Pacific railroad, copper matte was shipped from these mines 700 miles by wagons to the nearest railroad. But notwithstanding the enormous cost of the transportation, the mines were worked at a profit. This mine appears to be a regular mountain of ore; neither tunnel nor drift has yet found a vein wall. The property is worked as a quarry, rather than a mine. It belongs to a company which keeps its business to itself. Hence very little information can be gained as to its yield. Report fixes it at about three and one-half tons of matte per day. The amount, whatever it may be, will soon be materially increased by a proposed increase of the reduction facilities. The mines will soon have direct railroad communication by a branch with the Southern Pacific railroad.

Extensive Placers.

The placer mines on the San Francisco river in that country are very extensive and undoubtedly rich. A Boston company has recently purchased 1,000 acres of placer ground there, and are making preparations to work it on a large scale. These gravel beds have been thoroughly prospected and show good pay gravel everywhere. Fifteen miles of piping have been laid, and hydraulic appliances will soon be put up for working this ground in a thorough and economical manner.

Bullion Yield of Arizona.

No truer test of the richness of the Arizona mines can be found than the steadily increasing volume of bullion shipments from that Territory. The yield has probably increased three fold since the Southern Pacific railroad has been constructed through the so then mineral field of the Territory. A like increase may reasonably be expected to follow the completion of the Atlantic and Pacific, which is now nearly completed through the northern portion of the State. And when a complete railroad system for the Territory is constructed by branches from and connections with the two great trunk lines; no one need be surprised to see Arizona suddenly step to the very front rank as the largest bullion producing Territory in the Union.

The yield of the Territory for 1881, as reported by Wells, Fargo & Co., was \$4,000,000; but this did not include the raw ores, concentrations and large amount of placer gold which annually finds its way out by private hands. The Mint report for 1881 gives the yield for that year as \$8,440,775. This estimate does not include the copper product, which may be set down at fully \$1,500,000, nor the ores shipped out of the Territory. In view of the rapid rate of bullion increase, it may be safe to estimate the yield for the year 1882 at fully \$10,000,000.

[Since the above was in type we have received the following, which is probably as reliable as anything we can get short of actual official reports: "The value of the copper produced in Arizona for the year 1882 was \$2,945,284.40, being 17,201,586 pounds. The gold and silver yield of the Territory was \$10,257,089.88. The Tucson Star believes there was produced \$1,500,000 worth of copper not reported, and therefore not included above."]

This is certainly a good showing for a Territory where total shipment seven years ago amounted to only \$109,083. Probably no mining region can make a better show for the capital invested than Arizona. Capital there has been less reckless than almost anywhere else, and there is probably no country where the character and value of the mines can be more readily determined or with greater certainty.

Quartz Mills in Arizona.

The number of quartz mills and stamps in Arizona is given in the last Mint Report as follows:

County.	No. Mills.	No. Stamps.
Cochise.....	9	145
Gila.....	12	79
Maricopa.....	3	95
Mohave.....	7	60
Pima.....	5	52
Pinal.....	4	37
Yavapai.....	15	117
Yuma.....	1	5
Total.....	66	590

Useful Hints.

We clip from a late number of the Prescott Miner the following useful hints which may not be out of place in this connection: "As a general thing in Arizona, ores found upon the surface are free milling, and so long as the ore remains such in going down upon the various mines which have been worked, good results were achieved, but so soon as water level is struck and sulphurets appear, the ordinary machinery in use fails to save the metal, and suspension of operations is necessary. In every instance, without a single exception, assays show the sulphuret ores to be the richer, hence the only thing necessary to make mining a success in all this section is the proper machinery for the treatment of rebellious ores. Experienced men to operate the machinery necessary for properly treating base ores is also very essential. Mining, like other things, must be dealt with intelligently, and because one run upon certain ore fails to pay it does not necessarily follow that another run will. Good management and favorable circumstances have much to do with the treatment of ores."

W. B. EWER.

MONEY VALUE OF SCIENCE.—The Signal Service office estimates that ships containing at least \$13,000,000 of property, besides many lives, were saved from running into the disastrous cyclone during the month of November last, by the warning it gave. The money thus saved in this one storm would pay the expense of the Service for 10 years.

THE ENGINEER.

THE CANADIAN PACIFIC TO BE COMPLETED IN 1887.—Mr. Collingwood Schreiber, chief engineer of Government railways, who was recently on a tour of inspection over the Canadian Pacific railway, has been interviewed by a reporter of the *St. John, N. B., Sun* on the progress of work on the great national highway with the following interesting results:

"Calendar station," said Mr. Schreiber, with the air of a man who knows just what an interviewer wants and exactly what he doesn't require, "is the western terminus of the old extension of the Canadian Central. The track is laid from Calendar station for thirty miles westward, and the road is graded for about twenty miles in advance of that. From this point, fifty miles west of Calendar, to the river there is a gap, and the surveyors are now at work locating the line. Between the river and Prince Arthur's Landing a long stretch of rough, hilly, rocky country intervenes. Here the grading is progressing very rapidly, and probably five or ten miles of track are in position. Calendar station to Prince Arthur's Landing comprises what is called the eastern section, which is 650 miles or so in length from the crossing of the Saskatchewan. Surveys are in progress over the Rockies to Kauloops. The eastern end of the work to Emory's Bar, 127 miles is being constructed."

CANAL CONSTRUCTION IN EUROPE. Among the many canals projected on the continent of Europe is one to connect the Danube and the Elbe, one from Cologne to Antwerp, and a third to connect Brussels and Louvain with the sea, likewise by way of Antwerp. The Danube-Elbe project is an important one, for the proposed canal would be 138 miles long, and would, it is estimated, cost \$29,000,000. The depth of the water in the canal would be six and a half feet, and the width of the canal bed forty-eight feet. The value of each of these canals obviously would be very great; and that connecting Cologne and Antwerp would have an immense influence in still further developing the resources of Belgium. The prosperity of Cologne would be greatly enhanced, a consummation most devoutly to be wished, if it should carry with it some diminution of the famous "seventy stinks, all well defined, and several stenches," of the city of the Eleven Thousand Virgins.

THE CHANNEL TUNNEL.—According to reports from Paris, the suspension of the boring of the Channel tunnel is regarded in that city as a lamentable error of judgment on the part of the Government and people of England. The French company, meantime, are going forward diligently with the boring on this side. M. Raoul Duval, the Director of the Calais and Dover railway, and a strong partisan of the scheme, has just been to Calais for the purpose of inspecting the works, which are progressing perfectly under the direction of M. Breton, the engineer who is conducting this great undertaking. The gallery on the French side is now about 1,600 ft. in length, with a square diameter of a little over six and a half feet, and it already extends to a distance of over 100 ft. under the sea. The Beaumont machine, which is worked by compressed air, will be used until the gallery measures about 5,000 ft. in height.

ELECTRIC NAVIGATION.—Prof. S. P. Thompson lately gave a description of the trial trip of the *Electricity*, a launch propelled by a screw actuated by an electro-motor, the current for which was supplied by storage batteries of the Sellen-Volekmar type. The launch is 26 feet long, about 5 feet wide, and draws about 2 feet of water, the propeller being about 22 inches in diameter. She carries 45 storage batteries, each about 10 inches cube, said to be capable of supplying 4 horse-power for 6 hours. The accumulators have an electro-motive force of 96 volts, and during the run the current through each machine was steadily maintained at 24 amperes. Prof. Thompson reports the speed of the vessel to have been about 8 knots an hour against the tide, while the return journey from London Bridge to Millwall (distance not stated) was made in 24 minutes.

SAWDUST IN THE UPPER MISSISSIPPI.—The statement was made some time ago on what seemed to be good authority, that the Upper Mississippi was gradually becoming filled with sawdust, and that it was or soon would be detrimental to navigation. *Wood and Iron* says that a joint committee of prominent business men and steamboatmen of St. Paul and Minneapolis have been making an investigation of this matter, and found no sawdust accumulating in the main channel, and think the accumulation in the eddies and shallows will prove an advantage, instead of, as was at one time feared, a serious impediment to navigation; that is, by lodging on the wing-bars and shallows it serves the purpose of protecting them from the washing of the current, by which the sand was removed and deposited in the main channel.

A NOVEL BRIDGE.—A patent has recently been taken out for a bridge, which is so constructed that it will be raised off its foundations by high water, and at the same time can be used for crossing. To each end of the bridge aprons are hinged, which connect at one end with the foundations at the road levels and with the bridge at the other end, and afford practicable ascent to and descent from the bridge while it is floating above the foundations.

USEFUL INFORMATION.

Chinese Mode of Manufacturing Sheet Lead.

The making of sheet lead for the lining of tea chests, etc., is a somewhat important industry of Hongkong. It is made principally in sundry establishments to the westward. On entering one, the workmen will be seen with shears busily employed in cutting out the sheets of lead into the required sizes and shapes. The shears are simply a large pair of scissors, firmly fixed to a solid block of wood two feet in height. The lower blade of the shears terminates in a square piece of iron, instead of being pointed, as is the upper blade. The sheets of lead will also be observed to be of small size and somewhat irregular in shape, and this arises from the method of manufacture, as will subsequently be seen. Going further into the shop will be seen an iron pan raised 12 inches or so above the ground and carefully finished off.

Beneath this iron pan is a furnace, and at the side of the pan next the wall is the flue communicating with it. In this pan the lead is melted, and when judged to be hot enough, the workmen take two of the large, square paving tiles, which may be seen almost anywhere in the colony, and these are then smoothly and carefully covered with several layers of unsized paper. Having placed these two tiles before him, one above the other, the workman raises the upper tile with his left hand, and taking a ladle of the proper size in his right, he dips it in the melted lead and then pours its contents on the upper tile and quickly presses the lead out in the form of a sheet. The paper being a bad conductor of heat, the lead does not solidify immediately it leaves the ladle, and, by long practice, the workmen always ladle out exactly the same quantity of lead; the sheets made vary but little in size or thickness.

"Crackle" Glass.

An ingenious process for producing glass with an iced or crackled surface, suitable for many decorative purposes, has been invented in France by Bay. The product appears in the form of sheets or panes, one side of which is smooth and glossy like common window glass, while the other is rough and filled with innumerable crevices, giving it the frozen or crackled appearance so much admired for many decorative purposes. The peculiar crackled surface is obtained by covering the surface of the sheet on the table with a thick coating of some cross-grained flux mixed to form a paste, or with a coating of some more easily fusible glass, and then subjecting it to the action of a strong fire, either open or in a muffle. As soon as the coating is fused, and the table is red hot, it is withdrawn and rapidly cooled. The superficial layer of flux separates itself in this operation from the underlying glass surface, and leaves behind the evidence of its attachment to the same, in the form of numberless irregularities, scales, irregular crystal forms, etc., giving the glass surface the peculiar appearance to which the above name has been given. The rapid cooling of the glass may be facilitated with the aid of a stream of cold air, or by continuously projecting a fine spray of cold water upon it. By protecting certain portions of the glass surface from contact with the flux, with the use of a template of any ornamental or other desired form, these portions will retain their ordinary appearance, and will show the form of the design very strongly outlined beside the crackled surface. In this manner letters, arabesques and other patterns, in white or colored glass, can be produced with great ease and fine effect.

LUMINOUS PAINT.—The color of the light of luminous paint is generally white, or at first a little bluish or yellowish white. A Dresden firm now produces various paints—pure white, blue, red, green, violet and gray, so that the objects which become luminous at night may have a pleasing appearance by day. This paint is fast becoming utilized for various purposes. The last we noticed is that of a railway carriage painted inside, and intended to be placed on one of the trains between London and Rotherhithe, via the Thames tunnel. Although only one-half of the available space of the carriage is painted, the phosphorescent light is quite sufficient to enable the passengers to distinguish small objects when passing through the tunnel; and, moreover, the light is powerful enough to enable a person to read the indication of an ordinary watch. It is probable that the railway companies will be enabled to effect a considerable saving in gas and oil by using the phosphorescent paint.

WATER PROOF PAPER.—By plunging a sheet of paper into an ammoniacal solution of copper for an instant, then passing it between the cylinders and drying it, it is rendered entirely impermeable to water, and may even be boiled without disintegrating. Two, three or any number of sheets rolled together become permanently adherent, and form a material having the strength of wood. By the interposition of cloth or any kind of fiber between the layers the strength is greatly increased.

NEW PAVING MATERIAL.—An experiment is to be made in New Orleans to adopt mosquito wood, a native of Texas, very durable and nearly as hard as iron, for street paving purposes. It is so abundant that the cost of cutting and transporting it will be very light.

The bicycle is steadily widening its field of usefulness. The experiment of its employment by letter carriers for the delivery and collection of mail matter seems to be a success, and it is likely that the next thing will be its utilization for the delivery of newspapers in suburban localities. In the West it is already coming into use for newspaper delivery. The *Cincinnati Gazette* is served regularly to subscribers in the town of Greenville, Ohio, by carriers mounted upon bicycles.

WHITE JAPAN FOR REFLECTORS.—A white paint for lamp reflectors which has a fine porcelain finish and needs no heating is made as follows: Mix pure white zinc (dry) with sufficient soluble glass (silicate of soda) to be easily applied with a brush. Apply one coat and dry by artificial heat, if convenient; then apply a second heavy coat, and dry either in an oven at from 150 to 200 F., or at ordinary temperature.

SOLIDIFYING PETROLEUM.—We have already in this column mentioned the fact that some French chemists had succeeded in so solidifying petroleum that it could be readily handled in solid cubes. We now learn that this solidification is effected by adding to distilled petroleum 25 per cent. of the purified juice of plants belonging to the family of the euphorbiaceae. Petroleum solidified burns like tallow or paraffine.

IRON AND WOOD MAY BE JOINED WITH THE FOLLOWING COMPOSITION: Fine Russian isinglass is dissolved in strong acetic acid (pyroglucous acid) until the consistence of a strong, firm glue is obtained.

A NEW glass, transparent and more brilliant than common crystal, but containing no silica, potash, soda, lime, or borax, has been invented by a chemist in Vienna. It can be cut and polished, and when fused adheres to iron, bronze and zinc.

ANNEXATION EXTRAORDINARY.—A few weeks ago, during a heavy storm, the Rio Grande river suddenly changed its course by cutting through a bend near Camargo, and thus placed several acres of inhabited territory in Mexico within the legal limit of the United States.

UTILIZING PYRITES.—The manufacture of sulphuric acid from pyrites has recently been commenced at Nashville, Tenn., and at Atlanta, Ga.

GOOD HEALTH.

"Weight" in the Stomach.

I frequently meet a case of indigestion, the most marked feature of which is what the patient calls "weight in the stomach." Sometimes it is spoken of as a pressure, and again as stricture, but the most common word is *weight*. Sometimes the patient will say, "It seems to me I have a stone or a mass of iron;" and one lady said, the other day, "I have an iron wedge in my stomach." Generally these sufferers attribute the sensation to the weight of food. A clergyman said, "I suppose my stomach has become sensitive to pressure, and the food pressing upon the surface which has become so tender produces this sensation of weight." This explanation is entirely at fault. Instead of being produced by the presence of a heavy mass in the stomach, in its most intense and unbearable forms, I have found that it does not appear in connection with a full meal, but is much more likely to come on after eating a few mouthfuls of cracker or fine flour bread, or a single hot biscuit. The patient may have ground it with his teeth with the greatest ease, but, soon after swallowing, this sensation of weight appears. More frequently, however, there seems to be no connection whatever with the presence of food in the stomach. The sensation is not produced so much by what is in the stomach as by certain conditions of the walls of the stomach itself; in brief, it is produced by congestion of the walls of the organ. Accompanying this congestion there is generally an adhesive mucus poured out which sticks to the inner coat. I may add that this sensation of weight is nearly always a little to the right of the pit of the stomach, and that it is found that the congestion and adhesive mucus, which seem to stand in the relation of cause to this sensation, are found at the right or pyloric extremity of the stomach.

This sensation of weight is not relieved by stimulus. If it was produced by a load of food pressing upon the weakened walls of the stomach, a glass of whisky or wine would afford at least a temporary relief, whereas it is found that the employment of alcoholic drinks only increases the trouble. Indeed, drunkards suffer more intensely from this sensation of "weight in the stomach" than any other class of dyspeptics.

The most striking relief, for the time being, is obtained from hot fomentations over the pit of the stomach. A mustard poultice applied over the stomach is very effectual.—*Dr. W. Lewis.*

THE CONDITIONS OF HEALTH.—In order to have good health, the following conditions are imperative: 1. Pure air. 2. Pure and nutritious food. 3. Proper exercise. 4. Undisturbed sleep. 5. Regularity. 6. Temperance in all things. 7. Pleasant and active mental, moral and social conditions. 8. Right bodily positions. 9. Cleanliness. 10. Sunlight.—*Herald of Health.*

CAUSES OF SICKNESS.—A reporter visited Mr. Brewer's Academy, at San Mateo, at the time of the death of Ashley Oldham, of Gilroy, one of the pupils. As there were some cases of diphtheria in the school, the eye of the reporter was led to notice the superabundant shade of trees and shrubs which shut out the sunlight from the premises and caused mwholesome vapors from the irrigated grounds to produce diseased germs. In his judgment, this was the cause of sickness at that pleasantly-situated institution. A few days since we were driving on the San Juan road and noticed the surroundings of the residence of the Allen family, in which there has recently been one fatal case of quinsy and a reported case or two of diphtheria. On the south side of the house, a few feet distant from it, is a coral where scores of cows stand at milking time, and where they leave their fecal matter to dry in the sun and poison the air. This foul, disease-breeding air is wafted by the southern breeze into the house, where the sick try to live off its effects by the aid of medicine and the daily visits of the doctor, which extend over weeks and months. The suffering inmates want pure air. Move them, and the house with them, to the fine elevation some few hundred yards to the west, and in a short time they will be able to "throw physic to the dogs."—*Gilroy Advocate.*

CARBOLIC ACID FOR DIPHTHERIA.—In a communication to the *Chicago Medical Journal*, Dr. McGill describes a method of treating diphtheria, from which he has secured far better results than from any other. He uses an ordinary hose, from two to five feet long and about one inch in diameter. One end of this is placed over the spout of a common tea kettle, into which has been put half a gallon of water and half an ounce of carbolic acid; the kettle is then placed on the stove over a good fire, and when the water reaches the boiling point the end of the hose is carried under a blanket thrown over the patient's head. The room must be closed. In a short time the patient will perspire freely. If persevered in at short intervals, the breathing becomes softer, and presently, after a succession of quick, expulsive efforts, the patient throws off a coat or tube of false membrane. The acid vapor seems to prevent the reformation of exudations. Alcohol and sulphate of quinine are used in conjunction with the acid for the supporting properties.

ANÆSTHETIC BULLETS.—A German chemist has invented a new kind of bullet, which, he urges, will, if brought into general use, greatly diminish, if not altogether remove, the horrors of war. The bullet is of a brittle substance, breaking directly as it comes in contact with the object at which it is aimed. It contains a powerful anæsthetic, producing instantaneously complete insensibility, lasting for twelve hours, which, except that the action of the heart continues, is not to be distinguished from death. A battle field where these bullets are used will in a short time be apparently covered with dead bodies, but in reality merely with the prostrate forms of soldiers reduced for the time being to a state of unconsciousness. While in this condition they may, the German chemist points out, be carefully packed in ambulance wagons and carried off as prisoners. Whole cities may in a like manner be reduced to helplessness by means of shells charged with the same compound. The anæsthetic bullet is also strongly recommended to the burglar and to the householder, no risk of hanging being involved by its use.

A NEW THEORY OF CONSUMPTION.—Consumption has hitherto been regarded as a disease of the lungs, which cannot be reached directly except by inhalation, and the value of that form of medication is problematical. A new theory of the disease, called the Salsbury theory, makes it one of unhealthy alimentation. According to this view, it is the fermenting of food in the stomach, which furnishes to the circulation noxious material that affects the lungs on reaching those organs. Granting the truth of the theory, we shall have to consider consumption as curable. All that needs to be done is to use only such food as will not ferment in the stomach, and to clean out that organ occasionally by a judicious use of warm water, with simple tonics before meals to aid the digestive process. A weak solution of ferrie per sulphate is recommended for inhalation to check hemorrhage in the severe stage of the disease. The idea is well worthy the attention of the many who are supposed to be in the initial stages of consumption. It would be an inestimable boon if it be the means of saving them, to say nothing of the many others whose cases are otherwise hopeless.—*Chicago Tribune.*

HOUSE PLANTS AND CONSUMPTION.—Professor Crudeli, of Rome, points out in the *Practitioner* that the keeping of plants in ill-ventilated rooms may cause malarious infections even in regions where malaria is unknown. Professor Eichwald, of St. Petersburg, reports the case of a lady who was attacked by true intermittent fever while living in a room containing plants, yet after the removal of the flower pots a cure without a relapse was effected. The mwholesome influence is said to be due, not to the plants, but to the damp earth in which they grow.

FOOD FOR CONSUMPTIVE PATIENTS.—Milk powder, mixed with powder of beef, is reported as having been used successfully by Dr. Dujardin-Beaumont in keeping up the strength of consumptive patients. For use both articles are dissolved in ordinary milk, and the stomach is said to be very tolerant of the mixture.



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SAN FRANCISCO:
Saturday Morning, Jan. 20, 1883.

TABLE OF CONTENTS.

EDITORIALS.—The Heald and Morris Envelope; Academy of Sciences; Expenses of Mining Companies, 33. Pending Events; Expenditure on Placer Claims; The Consolidated Virginia Mine; Getting Rid of Non-Paying Partners, 40. The Keeley Motor; Gold in Alaska; English Slag Hearth Furnace, 41. Patents and Inventions; Notice of Recent Patents, 44.

ILLUSTRATIONS.—The Heald and Morris "Reliance" Horizontal Engine, 33. Vertical Section of the English Slag Hearth; Horizontal Section of the English Slag Hearth, 41.

MECHANICAL PROGRESS.—Selecting and Using Belts; An Asphalt Mortar; A New Method of Making Railway Spikes; Keep Your Machinery Clean; Malleable Iron; Use Both Hands; A New Tram Car; Wonderful Iron-Making Process; The Finishing File; Slotting Saws; Frost and Fractures; Nail Mills, 35.

SCIENTIFIC PROGRESS.—The Origin of Life; Siemens' New Solar Theory; New Safety Lamp; A Pretty Scientific Experiment; Speculation in Electricity; Singular Laboratory Explosion; New Photo-Electric Battery; Professor Koch's Discovery Disputed; The Growth of Language, 35.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Assessments, Meetings and Dividends 36.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Idaho, Montana, New Mexico and Utah 36-7.

THE ENGINEER.—The Canadian Pacific to be Completed in 1887; Canal Construction in Europe; The Channel Tunnel; Electric Navigation; Sawdust in the Tinner Mission; A Novel Bridge, 39.

USEFUL INFORMATION.—Chinese Mode of Manufacturing Sheet Lead; "Crackle" Glass; Luminous Paint; Water Proof Paper; New Paving Material; White Japan for Reflectors; Solidifying Petroleum; Annexation Extraordinary; Utilizing Pyrites, 39.

GOOD HEALTH.—"Weight" in the Stomach; Causes of Sickness; Carbolic Acid for Diphtheria; The Conditions of Health; Anesthetic Bullets; A New Theory of Consumption; House Plants and Consumption; Food for Consumptive Patients, 39.

NEWS IN BRIEF.—On page 44 and other pages.

MISCELLANEOUS.—Southern Nevada; Verigold by the Geologist; Mexican Mining Laws; Sierra County Mines; Air in Mines, 34. Denver Exposition—No. 23, 33. Nevada's Salvation, 42.

Business Announcements.

Books—G. & C. Merriam & Co., Springfield, Mass. Powder—Tonite Powder Co., San Francisco. Notice of Dissolution—South Comstock G. & S. M. Co. Machinist Tools—Adm. Ketscher, San Francisco.

Passing Events.

There is very little news to report from the mining point of view. The news from Alaska, which we give in another column, telling of the discovery of placer mines on the Yukon river, is important; still it has been known that there was gold on the Yukon some time since, but the expedition now there is the first one which has made systematic work of it. They had a steamer and plenty of provisions. In a few years much more attention will be given to Alaska mining matters than is now the case.

The State Legislature is in session, but has done nothing so far of special interest to the miners or mechanics of the coast.

At a meeting of the Pacific Exchange Association after the adjournment of the Stock Board, the building and property of the Association was disposed of to an unknown bidder, supposed to be Charles Crocker, represented by C. H. Reynolds, a real estate dealer. The amount was \$81,000, which is said to be a great sacrifice. The land alone is said to have cost \$192,000, and the buildings nearly \$40,000 more. The Board will continue to occupy the building, renting of the purchaser.

The Navajo and Independence mines, at Tuscarora, paid \$40,000 to miners, teamsters and merchants this week on December account.

Expenditures on Placer Claims.

A very unexpected decision has been announced by the Supreme Court of this State in the matter of assessment work on mining claims, declaring that annual expenditures are required on placer claims the same as on lodes.

This decision is entirely contrary to what has generally been supposed to be the law of the subject. Section 2,324 of the Revised Statutes provides that, "On each claim located after the 10th day of May, 1872, and until a patent has been issued therefor, not less than \$100 worth of labor shall be performed or improvements made during each year."

Heretofore all the constructions of the law by the Interior Department, the Commissioner of the General Land Office, or the courts, have been to the effect that only lode claims were subject to the annual expenditure, placer claims being omitted.

In the case in point, however, is a very important decision, overthrowing all previous rulings. The case is that of Carney vs. the Arizona Mining Co., of Sierra county. The case was originally tried in the Superior Court of that county, and in substance was as follows: Carney and others located a tract of placer mining ground at the head of Jim Crow canyon, marked their boundaries properly, ran a tunnel several hundred feet in length and did other work. Some years afterwards the Arizona company located a large portion of the same ground, ran a long tunnel and applied for a patent. The original locators filed an adverse claim. The case came to trial, and the Arizona company set up that the boundaries were not, at the time they relocated, so marked as to be readily traceable, and that for more than a year previous the yearly expenditure had not been made. The plaintiff proved properly marked boundaries, and the Court held that no yearly expenditure was required by United States law on placer claims. Decision was rendered in favor of plaintiffs, and defendants appealed. It is the appealed case just decided which reverses the generally accepted tenor of the law. The appellant relied principally on the failure to do annual work, and this view of the case has been accepted and the decision of the Superior Court reversed, judgment being given for the defendants.

There is one point about this case that will make it a leading one. There were no local laws involved, as there were none in force in the district, and the decision is therefore one of general application referring to the general mining laws of the United States. Under this decision \$100 will have to be spent in labor or improvements each year on placer claims of 20 acres, or \$800 on each 160 acres, a fact miners will do well to remember. In view of the importance of this decision, we give it in full:

DEPARTMENT TWO.

[Filed December 21, 1882.]

CARNEY

VS.

THE ARIZONA GOLD MINING COMPANY.

No. 8,639.

In December, 1876, plaintiffs and their grantors located a series of placer mining claims, which claims contained about 100 acres. Work was done said claims until October, 1878, since which day the Court finds "plaintiffs did no work or made any improvements on their claim, of any value whatever, for the purpose of working, prospecting or improving their claims." The Court also finds that during the absence of the plaintiffs and their grantors, defendant's predecessors in interest, August 7, 1880, entered upon a portion of said lands, and located by Government subdivisions 81 72-100 acres of the mining ground previously located by plaintiff's predecessors in interest, in compliance with the laws of Congress, and proceeded to work by tunnel and shaft within their location lines, but outside of the boundaries of plaintiff's claims, and had, at the time of commencing this suit, expended \$6,000 in such work.

The substantial question involved in this controversy is whether the laws of Congress, requiring a certain amount of annual work to be done by persons claiming to hold until patent issued, apply as well to the class of claims known as placer claims as to the class known as lode or vein claims. The Act of Congress of May 10, 1872 (Sec. 2234, U. S. Rev. Stat.), requires that "on each claim located after the 10th day of May, 1872; and until a patent has been issued therefor, not less than \$100 worth of labor shall be performed or improvements made during each year;" and upon a failure to perform such work, the claim shall be open to relocation in the same manner as if no location had ever been made, provided that the original locators or their representatives have not resumed work before such relocation. Granting that from a close reading of the various sections of the act, from Section

2,319 to 2,328, Revised Statutes, it might appear that the clauses of Section 2,324, above referred to, were intended to apply only to claims upon lodes or veins, we are of opinion that Section 2,329 removes any doubt, and that the performance of annual work is required as well upon the one class of claims as upon the other. In Section 2,329 it is declared that claims usually called placers, including all forms of deposit, excepting veins of quartz or other rock, in place, shall be subject to entry and patent, under like circumstances and conditions and upon similar proceedings, as are provided for vein or lode locations. We think the effect of this section is to declare that the circumstances and conditions under which vein or lode claims may be entered and patented shall be likewise applicable to placer claims; that as a location of a vein or lode claim may be kept alive for the purpose of entry and patent only by the performance of the requisite amount of annual work, so a placer claim must be kept alive for the same purpose in the same manner. The Act of January 2, 1880 (21 Stat. at Large, 61), amending Section 2,324, Revised Statutes, is in harmony with this view, in speaking, as it does, of "the vein, lode, ledge or deposit sought to be patented."

Judgment reversed and cause remanded, with instructions to render judgment for defendant as to the lands within its location.

We concur:

MORRISON, C. J.
SHARPSTEIN, J.

MYRICK, J.

The Consolidated Virginia Mine.

The famous Consolidated Virginia mine on the Comstock, that paid for months consecutively million dollar dividends, and made colossal fortunes for a few men, only produced in bullion last year the pitiful sum of \$1,631.48. Yet the mine has been constantly worked. The work has been confined to opening out and partially prospecting the 2,500 and 2,700 levels, in the accomplishment of which there have been hoisted 10,090 tons of waste rock. On the 1,500, 1,650, 1,750 and 1,950 levels the drifts connecting with the old stopes still remain bulkheaded, it not being considered prudent as yet to attempt opening the old stopes. On the 2,300 level the drift run by the Best and Belcher Co. from the Gould and Curry and Best and Belcher joint shaft was connected in May last, and forms a valuable connection between that shaft and the C. and C. shaft. No further work has been done on this level except keeping open the various drifts, and connecting winzes necessary for ventilation.

Work will soon be commenced to continue the winze from the 2,500 level, now sunk 218 feet, down to the 2,900 level. The 2,700 level was reached last February by the joint winze sunk from the 2,500 level. A station was cut out and a joint lateral east drift was started in March. This joint east drift has been extended 450 feet and connected with the main south lateral drift run through the lateral ground in June last, which carries the natural ventilation down to this level and forms a base for future operations in depth.

Mr. W. H. Patton in his annual report concludes as follows: Our work the past year has demonstrated the fact that the Comstock lode in our lower levels continues to show great strength of formation, and the cutting of seams of quartz, giving assays, in the various drifts on the 2,500 and 2,700 levels, shows that it is mineralized, with a probability of finding ore deposits of value when the lower levels are fully opened. By the judicious use of the diamond drill I have been able to avoid, or control, the influx of larger quantities of water than our pumping machinery could handle. The sum of \$196,213 has been spent this year on the C. and C. shaft.

A PRIZE FOR MINE LAMPS.—A gentleman of Manchester, England, Mr. Ellis Lever, has offered a prize of £500 for the most perfect portable lamp for mining purposes. A competent committee is to investigate by actual test all the lamps brought forward for competition. Here is a chance for inventors in this country who think they know what a mine lamp is and how to make one. It is expected that the lamp shall be an electric one. It is curious that an objection like the following should come from one of the English mining papers: "Exclusive of candles used in some few mines, we believe it may be assumed that at the various coal mines in the kingdom there are now something like 600,000 lamps in use, and were these to be replaced by those lighted by electricity, this would involve a loss or expenditure of an enormous sum of money."

Getting Rid of Non-Paying Partners.

The mining laws of the United States provide that upon the failure of anyone of several co-owners to contribute his proportion of the annual expenditures required, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give the delinquent co-owner personal notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for 90 days, and if at the expiration of 90 days after such notice in writing or by publication the delinquent should fail or refuse to contribute his proportion, his interest in the claim becomes the property of his co-owners who have made the required expenditures.

It must be remembered that the party who contributes his portion of the required expenditures can retain his interest. If a party fails to contribute his proportion of the actual expenditures upon a mining claim, the remedy lies in the courts. The U. S. mining laws only provide for failure to expend the proper proportion of the annual expenditures required by those laws.

In the first place, when the partners have done their share, and one miner has done his, he who has done the work records an affidavit like the following, which is *prima facie* evidence of the performance of such labor:

Proof of Labor.

—of — County of —, ss.
Before me the subscriber personally appeared —, who being duly sworn says that at least — dollars' worth of labor or improvements were performed or made upon (here describe claim), situated in — mining district, — county, — of —, during the year ending —, 188—. Such expenditure was made by or at the expense of —, owners of said claim for the purpose of holding said claim.
[Jurat.] — (Signature.)

NOTE.—The record of an affidavit like the above is *prima facie* evidence of the performance of such labor.

Then a notice of forfeiture should be sent to the delinquent, and published in the local paper. At the expiration of 180 days this notice should be recorded, with the affidavit of the newspaper publisher that the same was published for 90 days, together with the affidavit of the party signing the notice to the effect that one or more of the partners or co-owners named in the published notice have not paid their share of the expenditure. This completes the record title. This notice of forfeiture is as follows:

Notice of Forfeiture.

— County, —, 188—. To — (names of all parties who have record title to any portion of the mine). You are hereby notified that I have expended — dollars in labor and improvements upon the — lode (describe the claim), as will appear by certificate filed —, 188—, in the office of the Recorder of said county (or district), in order to hold said premises under the provisions of Sec. 2,324 Revised Statutes of the United States, being the amount required to hold the same for the year ending —, 188—. And if within ninety days from the service of this notice (or within ninety days after this notice by publication), you fail or refuse to contribute your proportion of such expenditure as a co-owner, your interest in said claim will become the property of the subscriber under said Section 2324.
— (Signature.)

The affidavit of failure to contribute, referred to above, is in the following form:

Affidavit of Failure to Contribute.

— of —, County of —, ss.
—, being duly sworn, deposes and says that for the year ending —, 188—, he expended at least — dollars in labor and improvements upon the — lode (or — placer claim) (here describe the claim), to hold the same under the laws of the United States and of this — (district, Territory, or State); that due notice thereof was personally served upon —, co-owners, on the — day of —, 188—, (or was duly published in the —, as appears from the affidavit of the publisher thereof), and that — (of the said) co-owners have failed or refused to contribute their share of said expenditures within the time required by law.

Subscribed and sworn to before me this — day of —, 188—.

THE NEW YORK COMMERCIAL construes the election of Henry Villard, John W. Ellis and Fred Billings, Directors of the New York, Lake Shore and Buffalo railroad, as meaning a separate trans-continental road beginning at New York and ending at Puget Sound.

The Keeley Motor.

It will be recollected that the stockholders who have for several years past been furnishing Mr. Keeley with the means to pursue his investigations and construct his promised new motor recently became dissatisfied with his continuous delays and calls for more money, and commenced a suit to compel him either to initiate proceedings for obtaining a patent or divulge to them the precise nature of his discovery. This he has ever steadfastly refused to do, except in general terms; but after the suit was commenced, a proposition to stop the same was agreed upon, on condition that Mr. Keeley would disclose everything in full to a third party—an expert. The expert was mutually agreed upon in the person of William Boeckel, who has entered into close intimacy with Keeley, thoroughly investigated the whole matter, as he claims, and reported his full confidence in the actuality and practical value of the discovery, with the assertion that “both men of science and practical engineering skill alike would stand amazed to-day if they realized what Keeley has already accomplished.” The stockholders have expressed their fullest confidence in the report of the expert, and have also received from Mr. Keeley a note, in which the following sentence occurs:

“I am glad that all past misunderstanding between us has been removed, and have no doubt that the present friendly feeling and confidence will be maintained uninterruptedly. At your request, and with the aid of Mr. Boeckel, and of counsel, I have prepared a caveat for my generator, which has been forwarded to the Patent Office.”

Boeckel says he fully understands the motor, Keeley says he is ready, and the stockholders say they are satisfied. This is certainly a highly gratifying state of affairs all around.

The Keeley motor excitement commenced in 1874, and has been kept up for the past eight years with a degree of success highly creditable to the ingenuity of the inventor. He has now, practically, about two years longer in which to continue his experiments, worry his stockholders and practice upon the credulity of human nature in general, if such is his purpose.

But to be serious, it is much safer to admit the possibility of Keeley's alleged discovery than to denounce it as a humbug. So many wonderful things have been accomplished within the last fifty years that any man is regarded as somewhat reckless who ventures to pronounce anything impossible which it is impossible to prove so. The ocean steamship, the railroad, the telegraph, the telephone and the photophone were each and all once regarded, by good engineers and scientists of undoubted standing, to be just as impossible as the Keeley motor is now pronounced to be.

The Keeley motor comes under the head of the seemingly impossible, simply from the fact that it is based upon a secret law of nature, which, it is alleged, has been discovered by Keeley. No man can prove, or, in light of the past, safely say there is no such law. The safest thing to do is to still wait and hope for another two years' time, when it is barely possible “men of science and practical engineers” may once more stand amazed at the actual accomplishment of the seemingly impossible.

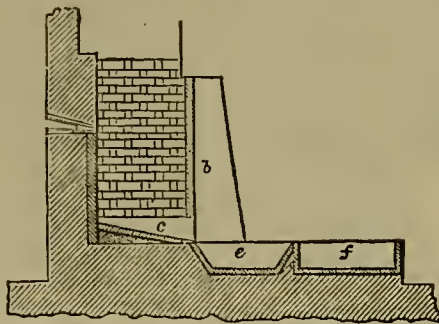
What Keeley Claims

As his discovery is the fact that water in its natural state is capable of being, by vibratory action, disintegrated so that its molecular structure is broken up, and there is evolved therefrom a permanent expansive gas, or “elastic medium,” or force, which result is produced by mechanical action with force capable of exerting an expansive energy of at least 25,000 pounds per square inch. In support of the reasonableness of such a possibility, Mr. Boeckel, in his argument, calls attention to a work recently published by Mr. Woodbury, member of the American Society of Mechanical Engineers, relating chiefly to the construction of mills, in which he recorded many interesting phenomena observed by him as to the vibration of mill structures. Among other examples, Mr. Woodbury mentions numerous instances where large stone structures have been thrown into rapid and is some cases dangerous vibration through the influence of a musical tone caused by a body of falling water some distance from the structure so vibrated. It is to be understood that the result so caused is not attributable to the concussion caused by the falling water, but is a phenomenon of a wholly different character, and which neither the increase nor the decrease

of the volume of water is capable of producing, if thereby a key-note not in sympathy with that of the mill structure is produced.

Mr. B. refers to other well-known similar instances, and adds that Mr. Keeley's inquiries have been conducted in this direction, and that his investigations and experiments have carried him far beyond the laboratory experiments of Crookes, Tyndall and other scientific investigators, until he has succeeded in exciting, harnessing and utilizing the subtle force which, to them, has been only a subject of scientific wonder.

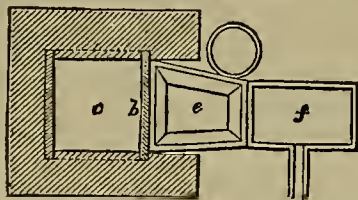
When the great energy of this new gas or elastic medium, or other source of energy, was first discovered, Mr. Keeley thought to utilize it in a manner similar to the utilization of steam, but he soon made the still further discovery that this new substance, or source of energy, possessed properties wholly unlike those of any other substance hitherto known, for which reason he was compelled to occupy much time



VERTICAL SECTION OF THE ENGLISH SLAG HEARTH.

in studying its properties and in devising some new way to produce and utilize the enormous energy which could be thereby developed. As a result he constructed what he called his “vibratory engine,” the details of which as a developer are well known to all the parties immediately interested in the invention.

But his great work, as claimed by the scientific expert, has been to devise some mechanical device whereby the power evolved by the proper mechanical vibration of water may be taken off and employed for useful work. This work, the expert claims, has been successfully accomplished, and three several engines constructed, the first of which was a measurable success, but the degree of success has been vastly augmented in succession by the second and third attempts. Mr. Keeley is still sanguine of further improvement in this direction,



HORIZONTAL SECTION OF THE ENGLISH SLAG HEARTH.

but is willing and has already filed his caveat for the progress he has thus far made, and will proceed to prepare his final papers within the two years still allowed him by the patent laws.

He considers his work as about completed, and is now constructing a fourth engine of 500 horse power, which will soon be completed and in full operation. The purpose is also announced of so bringing the matter to the attention of the Philadelphia Railroad Company as to have the first practical trial made upon their road between Philadelphia and New York. The stockholders and the public are assured that the line of experiment is now fully passed, and nothing is left to be done but the completion of the mechanical work upon the machine.

If there is a hitherto unknown law of nature which Mr. Keeley has discovered, the public are impatient to receive the proof, after which they will be ready to give Mr. Keeley all due honors for his discovery.

THE Congressional Committee on Ways and Means struck from the free list borax and boracic acid on the representations of the borax producers of the Pacific Coast, where deposits have been discovered, but need no protection. A rate of ten cents a pound was recommended for borax. This will interest those owning the borax works near Columbus, Esmeralda county. The duty will put thousands of dollars into their pockets. Borax only sells for ten cents a pound here, so the duty is full value.

Gold in Alaska.

In June last we gave an account in the MINING AND SCIENTIFIC PRESS of two parties having started for Alaska on mining expeditions. One of these parties, which went up on a sailing vessel, took a small stern-wheel steamer for the purpose of prospecting along the Yukon river. It was known that there were gold diggings several hundred miles from the mouth of the river, and the party intended to make a thorough exploration. Information has now been received that Schieffelin and his party, with the little steamer, carrying one-half of the three-years' supplies, ascended the Yukon 1,500 miles and established camp at the mouth of the Tananana. The boat was then sent back to St. Michaels for the remainder of the supplies, and Schieffelin went on a prospecting tour. Shortly after the boat left on the return voyage he made discovery in gravel washings of sufficient importance to justify the detail of a courier to

make the long and perilous journey overland to Sitka in order to convey the news rapidly to his brother, a capitalist residing in Philadelphia. The courier reached Sitka safely and dispatched the letter, which came to San Francisco on the last steamer, and is now on the way to Philadelphia by rail. It is reported that the washings in the gravel beds averaged \$1.50 per pan, and that in some instances \$10 per pan was produced.

The Yukon is an immense river, but is little navigated. There is a steamer running there which makes about two trips a year, but most of the navigation is by canoes. The river is frozen over until June, and as for paddling up stream when it is open, it is pretty hard work. Individual miners without much money would find the country rather an unpleasant one to go into. From all accounts

travel on foot is extremely difficult, owing to swamps, moss-covered surface and the dense timbers. If the information received is authentic, there will no doubt be many persons venturing the trip up the Yukon; but for the ordinary prospector, with small means, it will be a risky business.

Ex-Collector William Gouverneur Morris, of Alaska, who has just come back from there, and is on his way to Washington, in the course of an interview on Alaskan affairs, incidentally mentions the mining interests. The formation of the lodes, said he, is unlike any other known to the geological world, being entirely glacial in character. You will find a lode at the base of a mountain 3,000 or 4,000 ft. high, and you can trace it distinctly up the side, and on reaching the top you will find there an auriferous deposit, made by the moraine of the glacier, from 15 to 20 ft. deep. This is claimed by the surface diggers as placer claims, and for the last two seasons they have been successfully worked, to the detriment of the quartz claimants. About \$250,000 was taken out last season near Juneau and on Douglas island alone.

There being no courts whatever in the country, no law and no vestige or form of government whatever save that administered by the captain of a man-of-war and the Collector of Customs, it follows that those rival rights are as yet undetermined. No injunction can issue to restrain the placer diggers from pursuing

their vocation, and the quartz owners have so far restricted themselves to a policy of non-intervention, and have gone on sinking shafts and running tunnels to determine the value of their lodes. The work done is of a satisfactory character, and will justify further expenditure. Several mining companies have been formed in this city, backed up by men of capital, of which Wm. T. Coleman is one of the prime movers.

On Douglas island, opposite Juneau, is a series of mines as large as the whole Comstock lode. The opening of one of these lodes has so far demonstrated the value of the property that it is understood that the owners contemplate soon to erect a 100-stamp mill. The ore, though of low grade, is free milling and easily worked. In fact, said he, there is the largest body of ore in sight in the known world. The attention of Eastern capitalists has been directed to the island and a party of scientific and wealthy men will visit Alaska in the spring to examine this property. Though the interests of the placer and quartz miners clashed, and though there was no semblance of law, the miners were well behaved and orderly. Some time ago Commander Merriman visited the island in the U. S. ship *Adams*, in the interest of the preservation of the public peace, and induced both parties to come to an understanding by which the placer miners used the water during the day and the quartz miners during the night. But in his opinion this state of affairs could not last forever, because the development of the lodes will attract adventurous spirits who can't be easily controlled. It is, therefore, incumbent upon Congress at this session, if possible, to establish a court of justice, if nothing else, for that portion of Alaska. This all the miners are in favor of, and until this is granted it is no treasonable to be expected that capitalists will go to any very great extent in investing their means in that country.

English Slag Hearth Furnace.

The bottom of the furnace hearth, which slopes forwards and downwards, is formed of a cast-iron bed plate, *c*. In front of the hearth is a cast-iron tank or trough, *e*, known as the lead trough, into which the metal is run from the hearth, while in front of this again is another trough or slag pot, *f*, for the collection of the slag as it flows over from the surface of the metal in the lead trough.

In working this hearth it is first slagged out, or freed from any adhering slag left from the previous shift, and any badly corroded spots in the lining are repaired with clay, after which the bottom, or bed plate of the hearth, is covered with a layer of ashes, or small cinders, to a depth of from five to six inches, and made to slope like the bed plate from back to front, but leaving a space between its upper surface and the lower edge of the fore-stone, which space is stopped with clay, with the exception of an opening, or tap-hole, through which a quantity of the slag flows during the smelting campaign. A quantity of fuel, usually peat, is placed upon the hearth thus prepared, and ignited by the addition of a little burning coal, when the blast is turned on, and a quantity of coke is then thrown into the hearth. As the smelting proceeds, the reduced lead and the accompanying slag descend to the bottom, where the ashes, placed upon the bed plate of the furnace, serve as a kind of filter, through which the lead percolates and passes out from the front edge of the hearth into the tank, *e*, placed in front for its reception, and in the bottom of which is usually introduced a layer of cinders for further separating the metal from any slag passing out along with it. The lead flows from the lead trough, *e*, into a lead pot, heated by its own fire, and from which the metal is ladled into ingots, while the slag, passing from the hearth along with the lead, accumulates in the lead trough, which it overflows, and passes to the slag pot, *f*, already spoken of, and in which it collects; but the greater portion of the slag produced during the process of smelting passes out from the furnace through an opening made by a bar in the clay stopping.

At the end of the shift, when materials have ceased to be added to the furnace, and lead likewise ceased to flow from the hearth, the clay stopping is broken down, and the slaggy matter remaining on the hearth is raked forward and collected for addition as slag-hearth browse at the commencement of the next shift. The shift often lasts about eight hours, of which about six hours are employed in the smelting and two hours in cleansing out and preparing the hearth for the next shift. The lead produced in this hearth, and which is known as “slag lead,” is always hard and impure, from the presence of sulphur, antimony, copper and iron,

Nevada's Salvation.

Under the above heading the Carson *Tribune* publishes some sensible ideas in relation to the benefits Western Nevada will receive from the construction of the Carson and Colorado railroad, now being pushed southward. We copy the following extract as being to the point: But for the energy of the few men who risked their personal means in the construction of the road referred to, a fearfully dark prospect would be before us at this time, for the chances are strongly against any development on the Comstock that will be of general benefit, and but for the C. & C. the ledges south would have still lain dormant, if not undiscovered, and so we claim that the people of Western Nevada have much reason to be thankful that such men as control the narrow-gauge possessed not only the means but the energy to enter into such a speculation as the C. & C. R. R. The taxes of Esmeralda county will be greatly augmented, and so in Lyon county; hundreds of people will obtain employment, towns are building up along the line of the road; farmers will be benefited, mills will be erected and better than all for Carson, the number of employees in the machine shops of the V. & T. R. R. will be kept up if not increased, and so we say that the thanks of the whole community of the several counties through which the railroad passes, and of the Carson people, are due to the projectors and building of this very important railroad, for without doubt it will prove the salvation of Western Nevada.

The Esmeralda *Herald*, in speaking of the road, says: The Carson and Colorado railroad is already of great benefit to that portion of this State through which it extends, and to a large extent of country beyond. It not only increases the convenience and comfort of travelers but assists miners and prospectors in getting in and out of their field of operations. It is the intention of the company to extend the road through Mono and Inyo counties, and by so doing they will increase the business facilities of both those counties and at the same time increase in a large measure the business done at this end of the line.

SEEK

health and avoid sickness. Instead of feeling tired and worn out, instead of aches and pains, wouldn't you rather feel fresh and strong?

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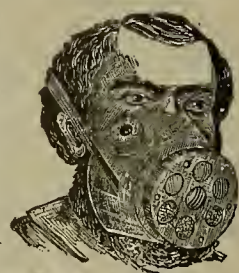


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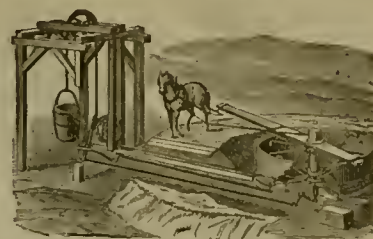
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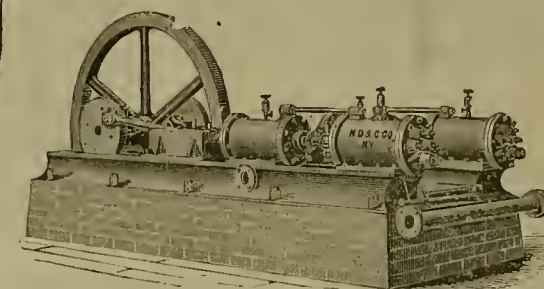
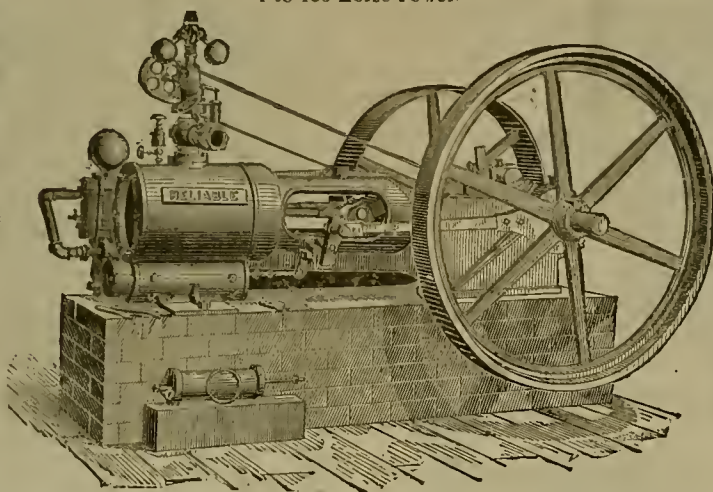
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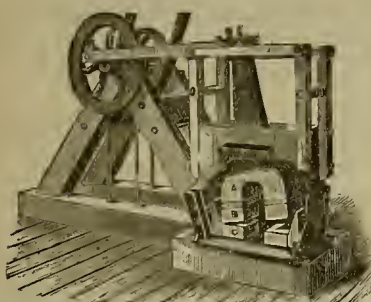
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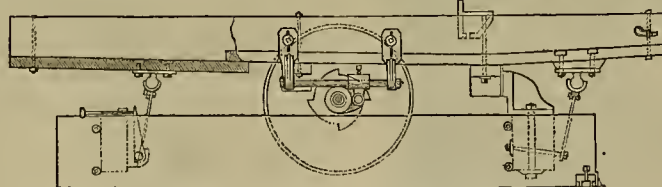


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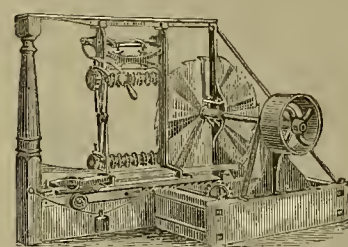


PATTEN'S CONCENTRATOR.

This machine requires less power, less care or attention, and is less liable to get out of repair than any concentrator now in use. All of which any practical miner will comprehend when seeing it in operation.

The wear and tear is nominal, and the construction so simple that any miner can put it up and run it; and the low price brings it within the reach of all mill men, as it will save enough to pay for itself in any mill in a very short time. One machine will concentrate the tailings from a five-stamp battery.

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For simplicity, durability and rapidity of action, these Machines have no equal, cutting from 3,000 to 4,000 per hour. They are now used by all the principal Millmen on the Pacific Coast.

SAWMILL MACHINERY,

Of all descriptions made to order.

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Located on the Shore of San Francisco Bay.

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The plant will be sold at a very low rate.

San Francisco Pioneer Screen Works
J. W. QUICK, MANUFACTURER.



Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT OUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

32 Fremont Street, San Francisco.

By TELEPHONE.—Subscribers, advertisers and other patrons of this office can address orders, or make appointments with the proprietors or agents by telephone, as we are connected with the central system in San Francisco.



Goods, and by the "GALLAND" IMPROVED SEWER GAS TRAP MFG CO., 1901 Broadway, Oakland, Cal. Coast Rights for sale.

Engraving.

Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of the Mining and Scientific Press, San Francisco, at favorable rates.

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Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

MECHANICAL DRAFTSMAN

WITH

Fourteen Years' practical experience, desires an engagement.

GOOD REFERENCES.

Address, "S." 766 Bryant Street, S. F.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT ABSTRACT, 252, Market St., S. F.

FOR WEEK ENDING JANUARY 9, 1883.

270,333.—REFRIGERATOR CAR—B. N. Bugbey, Sacramento, Cal.
270,411.—FISH TRAP—Jas. M. Frazer, Portland, Or.
270,564.—CABINET STEAM BATH—E. Sullivan, Cold Hill, Nev.
270,418.—ENGINE—P. K. Goodrich, San Francisco.
270,316.—MINER'S COMBINATION TOOL—John Jones, Oregon City, Or.
270,316.—MINER'S CANDLESTICK—John Jones, Oregon City, Or.
270,410.—CAR BRAKE—A. D. Kilborn and W. F. Smith, Tucson, A. T.
270,328.—VEHICLE BRAKE—F. I. Meyers, Healdsburg, Cal.
270,474.—HAND-TURNING TOOL—J. A. Plummer, Jr., & T. Sainford, Newark, Cal.
270,483.—ANCHOR—L. H. Rhoads, Bay Center, W. T.
270,529.—CANNING APPARATUS—Richard Wheeler, Alameda, Cal.
270,532.—SAWING MACHINE—D. W. Williams, Springfield, Cal.
270,356.—WRENCH AND PINNERS—Sam. L. Willmer, Anderson, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

ENGINE.—Periy F. Goodrich, S. F., Cal., assignor of one-fourth to Dexter Salisbury, of same place. No. 270,418. Dated Jan. 9, 1883. This invention relates to certain improvements in engines, and it consists in a means for expanding the steam or vapor which is introduced into the cylinder at a low pressure to a higher temperature and pressure by the admission of a quantity of explosive material into the cylinder with the steam at the beginning of each stroke, and igniting and exploding the same after the piston has commenced its stroke. The important feature of this invention is the starting of a piston upon each stroke in its cylinder by a low initial pressure of steam or other vapor, and then largely increasing that pressure without an undue shock or strain from the explosion. It is also for the purpose of intensely heating and expanding a volume of wet steam introduced into a cylinder at a low pressure, so as to obtain its greatest elastic power after its connection with the boiler has been severed, and finally it may be employed to superheat steam of a low temperature and pressure for any purpose after it has been cut off from the boiler.

VEHICLE BRAKE.—Francis I. Meyers, Healdsburg, Cal. No. 270,328. Dated Jan. 9, 1883. The invention relates to the class of vehicle brakes and to the means whereby power is transmitted from the lever to the brake locks. It consists in certain levers and shafts, and in the position of the latter. More particularly, it consists of two rocking shafts, to one of which, through a long arm and a connecting rod, the power is applied, and to the other, which carries the brake blocks, the power is transmitted by means of arms and rods connecting it with the first shaft. The second shaft is journaled higher up than the first, whereby longer arms may be provided and an increased leverage obtained, and the first shaft, by being low down, may have a longer arm connecting it with the main lever. The object of the invention is to provide a means, whereby the brakes may be applied with great power, and which will require but small force to operate them.

A NEW COURT.—The accumulation of business in the Supreme Court of the United States, resulting from appeals in excess of the number of cases which can be tried, has long called for a remedy. Not only is it proper that the Supreme Court should be relieved of much of the business which is now accumulating on its docket, but those having important interests at stake, which are dependent upon an authoritative decision, are entitled to some provision which will avoid the distressing delays that are now experienced, averaging about three years in each case. Congress has just established an Appellate Court to relieve the Supreme Court. Among those named for Judges of the Second district is Mr. James A. Whitney, L. L. D., who is receiving a very solid and influential support from the manufacturing interests. Mr. Whitney is one of the most scholarly men now practicing before the courts, and his long and successful experience in connection with patent litigation gives him peculiar qualifications. Mr. Whitney was at one time editor of the *American Artisan*. He is in every way suited to the position of Judge of the new court, and we hope the position will be tendered to him.

A MEDICINE of real merit, prescribed by many leading physicians, and universally recommended by those who have used it, as a true tonic, is Brown's Iron Bitters.

THE JUDSON MANUFACTURING COMPANY have removed their office and salesroom from 402 Front street to 329 Market. At their new quarters they will have goods of their own manufacture, such as tacks, brads, shoe and finishing nails, hardware, California Victor mowing machines, etc.

THE Mount Cory mine has been connected by telephone with the railroad station at Hawthorne. The distance is 11 miles.

Mining and Other Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

NOTICE OF DISSOLUTION.

OFFICE OF THE

South Comstock Gold and Silver Mining Company, No. 308 California Street, San Francisco, California, January 13, 1883.

Notice is hereby given that, pursuant to the provisions of Title Six of the Code of Civil Procedure of the State of California, a meeting of the STOCKHOLDERS of the SOUTH COMSTOCK GOLD AND SILVER MINING COMPANY, a corporation organized and existing under the laws of the State of California, will be held on MONDAY the 11th (5th) day of FEBRUARY, A. D. 1883, at the hour of TWO o'clock P. M., at said Company's office in room No. 4 of premises No. 309 California Street, in the City and County of San Francisco and State of California, to consider and vote upon the question of the voluntary dissolution of said Corporation and such other business as may properly come before said meeting.

By order of the President and Board of Trustees,
J. M. BUFFINGTON,
Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill & Mining Company.

San Francisco, January 10, 1883.

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 33, of fifty cents (50c) per share, was declared, payable on Monday, January 15, 1883. Transfer books closed on Thursday, January 11, 1883, at 3 o'clock P. M.

WM. WILL, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Company

ASSESSMENT, NO. 44,

Levied..... January 10, 1883
Delinquent..... February 15, 1883
Day of Sale..... March 8, 1883
Amount per Share..... Fifty Cents

ALFRED K. DUREBOW, Secy.

Office—Room 60, Nevada Block, 309 Montgomery St.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending December 31st, 1882, the Board of Directors of THE GERMAN SAVINGS AND LOAN SOCIETY has declared a dividend on Term Deposits at the rate of four and thirty-two one-hundredths (4 32-100) per cent. per annum, and on Ordinary Deposits at the rate of three and six-tenths (3 6-10) per cent. per annum, free from Federal Taxes, and payable on and after the 2nd day of January, 1883. By order,
GEO. LETTE, Secretary.

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In Sheep, Russia and Turkey Bindings.



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GET THE BEST
the latest edition with 118,000 Words, (3000 more than any other English Dictionary.)
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G. & C. MERRIAM & CO., Pub'rs, Springfield, Mass.

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MACHINISTS' TOOLS.

A 30"x30" Planer. One 24" and one 18" Lathe; also one Drill Press (Face Plate 30 inches). Must be in first-class order.

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Redlands.

Good water, rich soil and magnificent view. High elevation, dry air, few fogs and northerly.

No brush or fences on the land, which is especially adapted to the culture of the orange and raisin grape.

Near to church, school, store and depot. Hotel open. Telephone Communication.

Stage from San Bernardino Tuesdays, Thursdays and Saturdays.

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The Crowning Culmination! A \$5 Book for \$2.50!!
MOORE'S UNIVERSAL ASSISTANT,
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Enhanced Edition, contains over 1,300,000 Industrial Facts, Calculations, Processes, Trade Secrets, Legal Points, Business Forms, etc., of vast utility to every Mechanic, Farmer and Business Man. Gives 300,000 Items for Gas, Steam, Civil and Mining Engineers, Machinists, Millers, Blacksmiths, Founders, Miners, Metallurgists, Assayers, Plumber, Gas and Steam Fitters, Boilers, Builders, Metal and Wood Workers of every kind, Builders, Manufacturers and Mechanics. 500 ENGRAVINGS of Mill, Steam, and Mining Machinery. Tools, Sheet Metal Work, Mechanical Movements, Views of Mills, Boats, Bridges, etc. Arrangement and Speed of Wheels, Pulleys, Drums, Belts, Saws, Dories, Turning, Planing, & Drilling Tools, Flour, Oatmeal, Saw, Shingle Paper, Cotton, Woolen & Pulling Machinery, Sugar, Oil, Marble, Threshing & Rolling Mill, do., Cotton Gins, Presses, &c. Strength of Teeth, Shafting, Belting, Friction, Lathes, Gearing, Screw Cutting, Finishing, Precision Building, Repairing and Operating, Setting of Valves, Eccentrics, Link & Valve Motion, Steam Packing, Pipe & Boiler Covering, Scale Preventives, Steam Heating, Ventilation, Gas & Water Works, Hyd. Mines, Mill Dams, Horse Power of Streams, etc. On Blast Furnaces, Iron & Steel Manufacture, Prospecting and Exploring for Minerals, Quartz and Placer Mining, Assaying, Amalgamating, etc. 461 TABLES with 500,000 Calculations in all possible forms for Mechanics, Merchants and Farmers. 330 Items for Printers, Publishers and Writers for the Press. 1,000 Items for Grocers, Confectioners, Physicians, Druggists, etc. 300 Health Items. 200 do. for Painters, Varnishers, Glaziers, etc. 500 do. for Watchmakers & Jewelers. 400 do. for Hunters, Trappers, Tanners, Leather & Rubber Work, Navigation, Telegraphy, Photography, Bookkeeping, etc. in detail. Strength of Materials, Effects of Heat, Fuel Values, Specific Gravities, Freight by rail and water—a Car Load, Storage in Ships, Power of Steam, Water, Wind, Shrinkage of Castings, etc. 10,000 Items for Housekeepers, Farmers, Gardeners, Stock Owners, Bee-keepers, Lumbermen, etc. Fertilizers, full details, Rural Economy, Food Values, Care of Stock, Remedies for do., to increase Crops, Pest Poisons, Training Horses, Steam Power on Farms, Lathrop's CALCULATOR for Cubic Measures, Ready Reckoner, Produce, Rent, Board, Wages, Interest, Coal & Tonnage Tables, Land, Grain, Hay & Cattle Measurements, Seed, Flourishing, Planting & Breeding Tables, Contents of Granaries, Cribbs, Tanks, Cisterns, Boilers, Logs, Boards, Scantling, etc., at sight. Business Forms, all kinds, Special Laws of 49 States, Territories and Provinces (in the U. S. and Canada), relating to the Coll. of Debts, Exemptions from Forced Sale, Mechanics' Lien, the Jurisdiction of Courts, Sale of Real Estate, Rights of Married Women, Interest and Usury Laws, Limitation of Actions, etc.
"Forms complete treatises on the different subjects."—*Sci. Am.*
The work contains 1,016 pages, is a veritable Treasury of Useful Knowledge, and worth its weight in gold to any Mechanic, Business Man, or Farmer. Free by mail, in fine cloth, for \$2.50; in leather, for \$3.50. Address National Book Co., 73 Beekman St., New York.

Removal of Office of

JUDSON MANUFACTURING COMPANY.

SAN FRANCISCO, January 2, 1883.

NOTICE!

On and after January 4, 1883, the OFFICE and SALES-ROOM of the JUDSON MANUFACTURING CO. will be located at 329 Market Street, San Francisco, where we shall carry a full line of Goods of our own manufacture, such as Files, Tacks, Brads, Shoe, Box and Finishing Nails, Hardware and California Victor Mowing Machines

JUDSON MANUFACTURING CO.

BOONE & MILLER,

Attorneys & Counsellors-at-Law,

Rooms 7, 8 and 9.

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Special Attention Paid to Patent Law.

N. B.—Mr. J. L. Boone, of the above firm, has been connected with the patent business for over 15 years, and devotes himself almost exclusively to patent litigation and kindred branches.

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The above can be gotten from us or our AGENTS ONLY.

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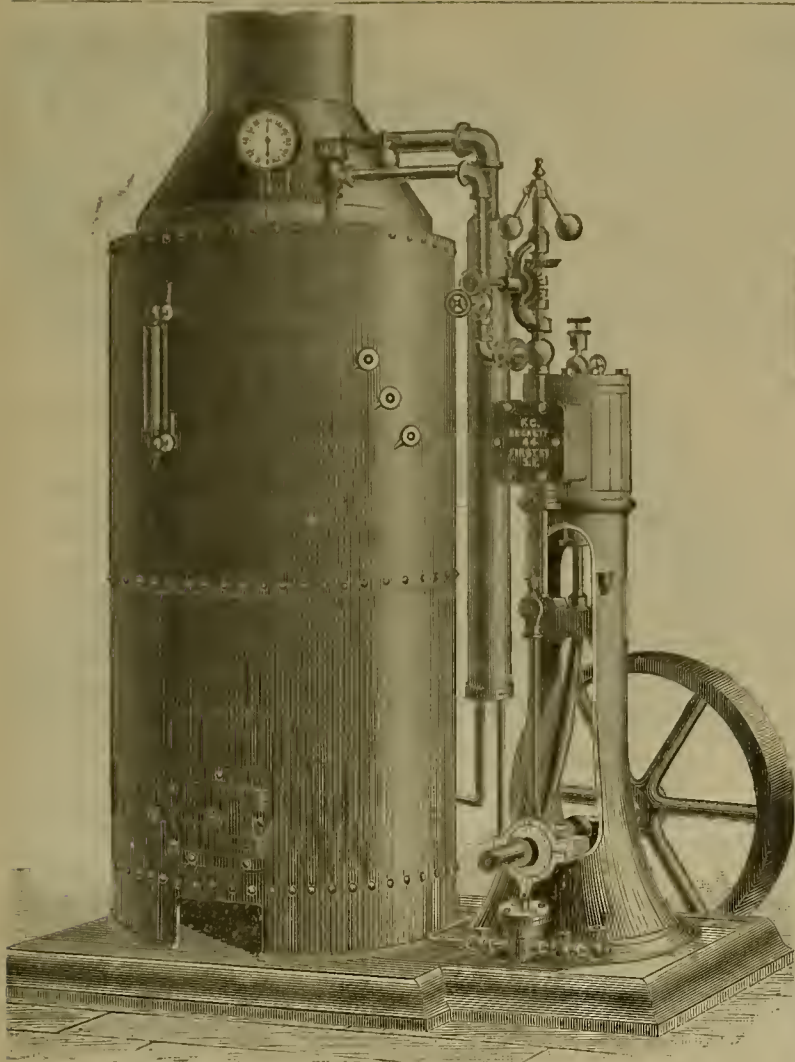
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Call Special Attention to their Improved Grades of Powder.

- NO. 1.—The most Powerful Explosive Compound now in use here.
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- NO. 3.—This grade is a Strong and Reliable Powder, which does excellent work.

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Is now used in all large Hydraulic Claims, and on most Railroads. It breaks much more ground, and obviates reblasting by breaking much finer. TRIPLE FORCE CAPS AND ALL GRADES OF FUSE.

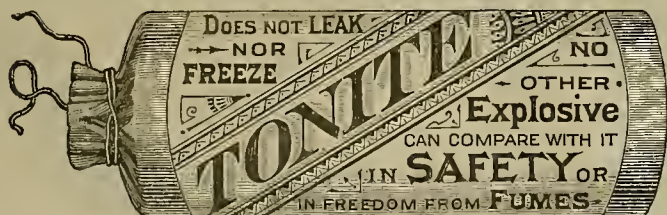
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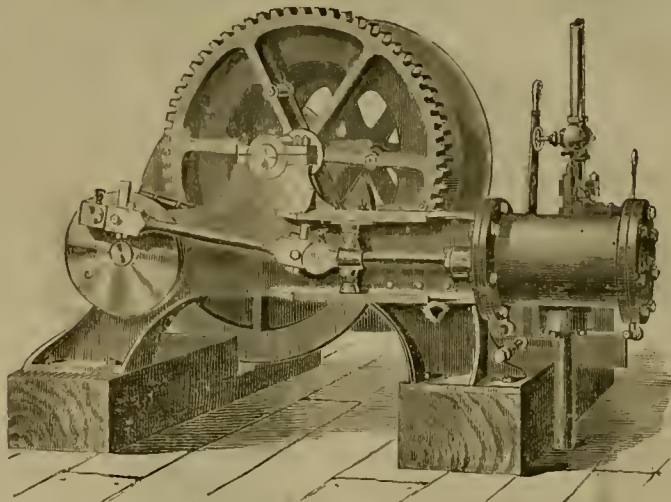
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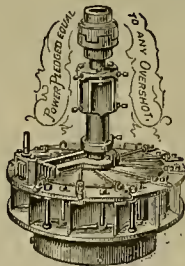
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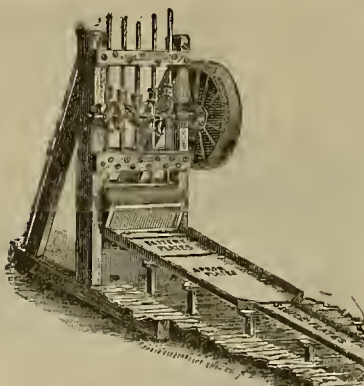
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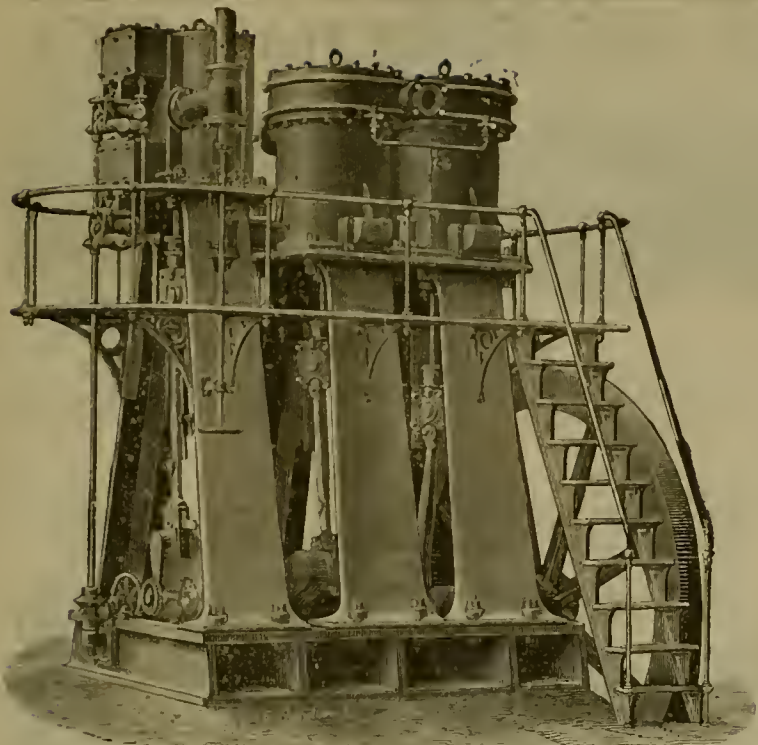
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SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

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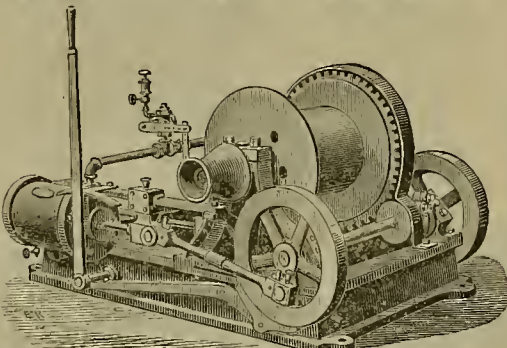
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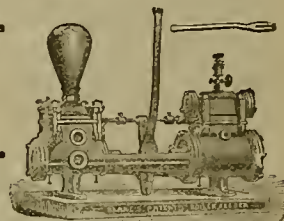
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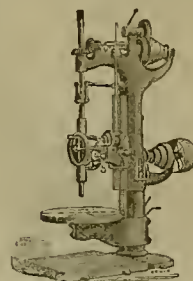
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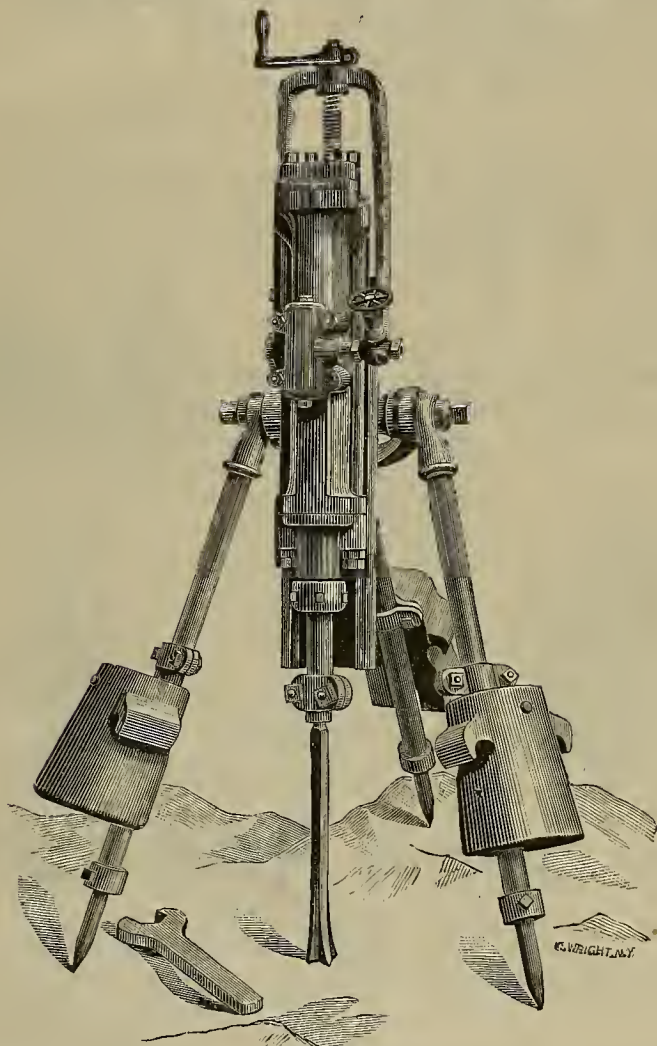
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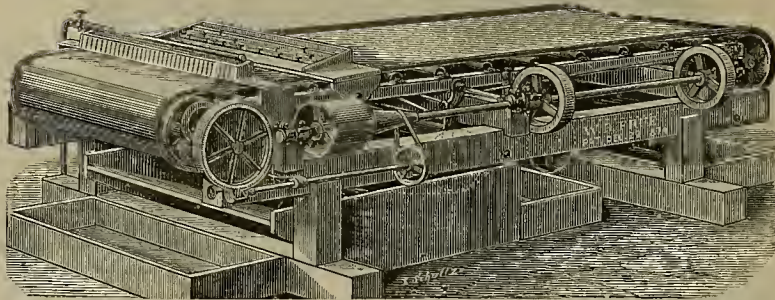
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To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

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Nov. 6, 1882.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

ANNUAL REVIEW—TWENTY-FOUR PAGES.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 27, 1883.

VOLUME XLVL
Number 4.

Locke's Improved Lead Smelting Furnace.

The exhibit at the Denver Exposition of an improved lead smelting furnace, manufactured by the Lane & Bodley Co. of Cincinnati, Ohio, from designs furnished by Col. Jos. M. Locke, C. E., M. E., of Salt Lake City, Utah, attracted considerable attention, especially from those interested in the reduction of ores. In designing the furnace Col. Locke has combined all the later improvements and been guided in the selection and arrangement of the same by the advice of the principal smelters in the West. The main features of this smelter can be briefly stated as follows: The crucible binders are made of ribbed wrought iron in lieu of cast, thus securing lightness without sacrifice of strength, and at the same time greatly reducing the liability to breakage. This substitution of wrought for cast iron extends throughout the whole structure. The furnace being of the rectangular pattern, the ground plan of the base is that of a rectangle 9x7½ ft., with the corners cut off, thus allowing the uprights which support the deck plate to have foundations outside of the crucible binders. These uprights are rolled I beams, the grooves in their sides forming excellent racks for tools. The deck plate is also made of rolled beams placed some distance apart, the space between them being utilized as a conduit for any vapors escaping from the furnace. Pipes lead from the above conduits to the top of the building. The water jacket, which is in sections, is made of steel, in the following manner: The sheet forming the fire side of the jacket is shaped into a box over six inches deep without cutting the corners, so as not to have any riveted or welded joint exposed to the fire. The back plate is formed into a shallow box fitting into the other, the concave sides of both boxes facing outward, the outer edges of the two parts being flush, and in which position they are riveted and caulked, thus caving the joint entirely on the outside. Attached to the outside of the jackets are hoppers open at the top, and through which the cold water is supplied to keep the jackets cool, and from which there is an overflow for the hot water. This form, known as the open-topped jacket, claims advantages over the old method of closed jackets with an inlet and outlet pipe, in which case, if the openings of the inlet pipes are neglected or either pipe becomes obstructed, the results are serious, as steam would in such a case accumulate in the jackets to force out the water, and thus expose the jacket to being burnt.

In the present form such neglect or accidents become known at once to the furnace man, and in case of obstruction to the supply pipes the open-topped hopper affords an opportunity to furnish the jacket with water during the repair of piping. The end jackets do not come down to the crucible by about seven inches. The space so left is filled up with a small closed top jacket which can be readily removed. This construction does away with the old-fashioned brick breast, and in case of necessity enables the furnace man to rapidly open and close up the furnace at any time it becomes desirable so to do. All the piping for air, supply and discharge of water, and the valves to the same are so arranged as to admit of any jacket being removed without disturbing the connection of the remainder, and all valves are within ready reach of the furnace man. The ultimate economy of

these steel jackets has been fully demonstrated by experience at the large smelting works of the Horn Silver Mining Company, near Salt Lake, where five furnaces are in operation, each measuring 40 inches by nine feet at the tuyers. These five furnaces during the first

Our New Dress.

The MINING AND SCIENTIFIC PRESS will appear to its subscribers this week like an old friend refreshed, cleansed and redressed after a long journey. Our old reading type bore well

to draw closer to us in the support of our enterprise. The expenditure for our new outfit is a sign of our devotion to the work, and we hope it will lead to reciprocal effort on the part of our patrons in the way of prompt renewals and kind words which will enlist others to give us their support. There are thousands more who should read the PRESS, and probably would if they should hear, from those who know it, of its value.

To our editorial friends, who are typographical experts, we can but appeal for kindly judgment. They know well that it is hard to get a new suit with all the seams properly pressed at the first appearance. Enjoy what is good and overlook defects. It is a good rule in all affairs.

American Institute of Mining Engineers.

The papers read at the more recent meetings of the American Institute of Mining Engineers have been of a character of much greater interest to miners on this coast than formerly. Until within the past two years nearly all the papers were on subjects more directly connected with the coal and iron interests of the country. The precious metal interests were seldom considered. The reason was, of course, that the more active members of the Institute, and those who wrote most, were professionally engaged among the coal and iron mines.

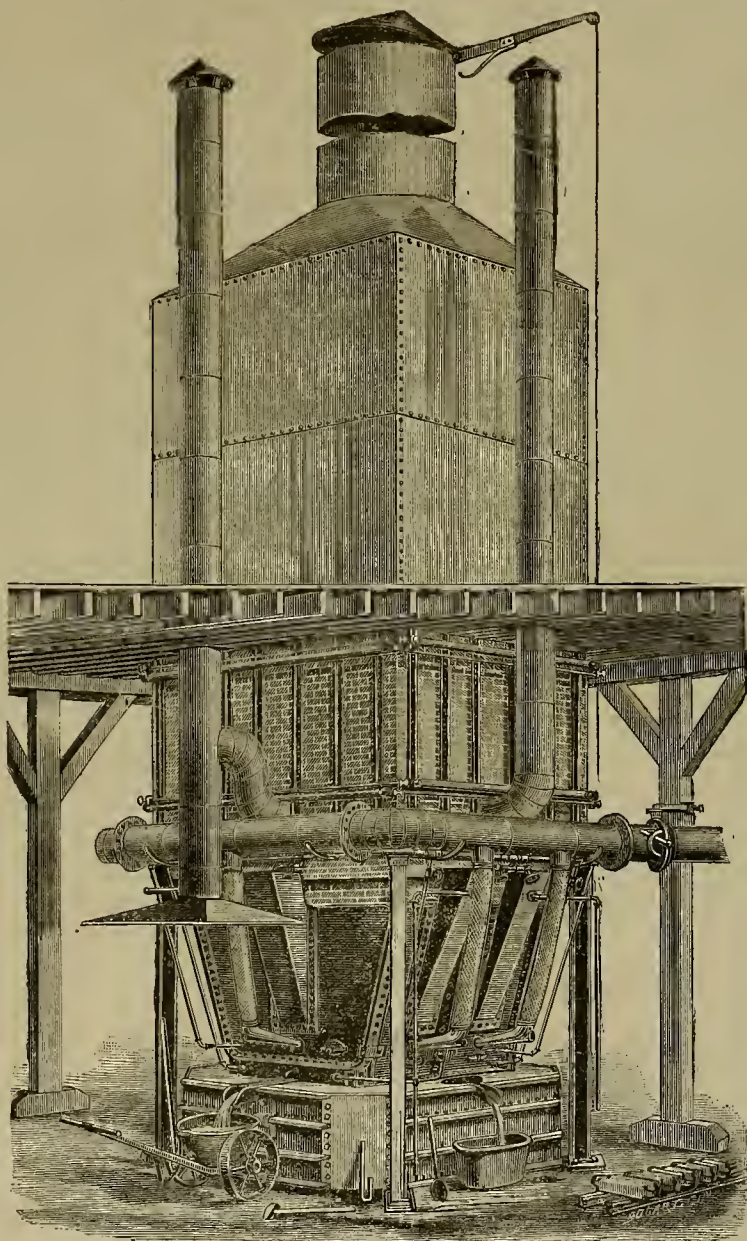
Now a change has taken place, and many of the gentlemen who are members of the association come out to this coast among the gold, silver, copper and lead mines. We see the result in papers which treat of matters connected with precious metal mining subjects which interest other miners than those who work in coal and iron.

It seems to us that this broadens the field of usefulness of the association very greatly indeed. Not only are there more papers read, but the proceedings, as published, are of greater value to a more general class. It cannot be said that the mining engineers of the coast who reported on or managed the great gold and silver mines were ever a very communicative class. Whatever they knew they kept pretty much to themselves. Messrs. Hague, Bowie and Goodyear published, as did Messrs. Kustel, Aaron and Phillips, but outside of these few but little from the pens of this class of the community ever came into public print.

The public have been dependent almost entirely on such journals as the MINING AND SCIENTIFIC PRESS for such details of mining and metallurgy as could be procured. The engineers were exceedingly reticent, and little more than generalities could be gleaned from them. The three or four attempts to form a society of mining engineers on this coast met with failure.

Now, however, that the American Institute of Mining Engineers has within it so many of the profession both competent and willing to go into the science of mining and metallurgy of the precious metals, and lead and copper as well as iron and coal, there is hope for us on this coast.

This makes the American Institute more of a national and less of a local institution. The papers will be welcomed everywhere instead of in one section only. The miners and metallurgists of the country will look to members of the Institute to elucidate knotty problems, and to give them the science essential to their business. We see in this a better field of usefulness for the Institute and an opportunity for it to develop into a much larger society than it ever has been.



THE LOCKE PATENT LEAD SMELTING FURNACE

six months of 1882 had an output of over \$2,000,000 in value.

The shape of the furnace internally is as follows: From the tuyers upwards the water jacket has a bosh on the sides, thus increasing the width to five and a half feet; the ends are perpendicular from the top of the jacket; the sides are perpendicular to the feed door, making the shaft five feet by five and one-half feet. The height should be adapted to the character of the ore to be worked. The Lane & Bodley Co. have a Western office at Salt Lake City, Utah, of which Col. Locke is manager.

the heavy task laid upon it, but its work is done.

This week we have the new type, with its sharp outlines and clear impressions, which we trust may make our paper all the more welcome, especially if we can, as we hope to do, make our selections of facts more pertinent and our deductions therefrom more vigorous and valuable than heretofore. The new type will also prove an acceptable comparison to the finer engravings which we expect to introduce in greater abundance than before.

The improved appearance of the paper may prove, we trust, an incentive to all our friends

CORRESPONDENCE.

The Black Sand Question.

Reason of Loss of Gold.

EDITORS PRESS:—Knowing the willingness of Professor Hanks to lend his time and ear for the investigation of any interesting fact connected with the production of more gold, I made the request for a day of his time, that together we might closely examine into the "black sand" question, as connected with hydraulic mining. I had just returned from the gravel mines of the Red Hill Hydraulic Mining and Water Co., located near Magalia, Butte Co., Cal. During my stay there a partial clean-up was had, in which I participated with the view of studying the character of gold and the best mode for saving the highest percentage. During the clean-up I observed that magnetic iron and iron in its various forms, from the size of beans to the finest pulverized "black sand," was moving down the sluices in large quantities. A cursory examination disclosed the fact that very minute particles of mercury were attached to the iron. I saw at once that here was a matter for investigation, as a minute particle of gold must be behind this mercury for it to thus attach itself to the iron. Black sand in all our hydraulic and drift mines is abundant, and that it contains more or less gold is universally known; but this gold has generally been considered free, and in a condition to be saved by careful washing. Although I had read of others' ideas and experiments on the black sand question, yet, like too many other hydraulic miners, have given the subject heretofore but little attention as connected with this class of mining. I now concluded on a very thorough investigation, and for this purpose collected a quantity of the iron, varying in size from coffee grains to the finest, and to the examination of this requested the Professor's attention and assistance. A general examination was first made through the Professor's powerful microscope, and the first view revealed a secret of much value to me, and should be to all hydraulic miners. Here was black sand and iron ore being washed off by the hundreds of pounds daily, much of which carried gold coated with a film of iron so thin as to prevent the adherence of mercury, and yet discernible as gold through the microscope, but not to the naked eye; some where mercury would attach itself to abraded points; other specimens so black as only to be suspected, but which the blow pipe revealed to be gold; "rusty gold" completely enveloped, and having no affinity for mercury; and with all this some particles of very fine bright gold.

I must say I was surprised at seeing so much gold in such condition, none of which is secured by our present system of washing. The Professor assured me he had examined black sands from other hydraulic mines with similar results, and only wondered that hydraulic miners before this has not given the matter more attention. It did not take many glances through the microscope to satisfy me that I had business ahead, as the stoppage of such a loss must be arrested as soon as possible. We worked, calculated and speculated on the value of the gold associated with the black sands washed off in the working of our hydraulic and drift mines. And here let me say, as first expressed by the Professor, the saving of these sands, when once entered upon by the hydraulic and drift miners, will solve, in a great degree, the debris problem; for the reason it will pay the hydraulic miner to change his mode of dumping debris. On this proposition I think I can say the Red Hill Company will lead off. On this question, however, I may have more to say hereafter. The microscope having revealed so much, I now concluded to find the value per ton of the sands of various degrees of fineness. To this end the first operation was sizing the ore, which resulted as follows, 100 being the standard:

No. sieves.	100 standard.	Val. per 100	Val. per ton
Ref. 5 and 10 mesh	20.75	\$11.10	\$222.00
" 10 " 20 "	1.20	34.20	684.00
" 30 " 40 "	7.25	2.70	54.00
" 40 " 60 "	63.41	24.00	480.00
" 60 " 100 "	7.29	.60	12.00

This makes an average of \$290 per ton. As extravagant as these figures may seem, there is no getting away from the gold buttons in hand. It is proper to state that between the sizes of 5 to 20 mesh were several pieces of iron quite heavily coated with rusty gold, hence such large results; this may and yet may not be exceptional; further testing will determine. That which attracts my particular attention, and goes further to convince me of the value of these sands, is the result of that as sized between 40 and 60. I can see how this grade of "black sand" is likely to possess the value independent of the rusty gold by gathering and holding in its strong, magnetic, if you please, embrace, the finer free gold. The further I progressed in these experiments the more astonished I became, and yet the Professor had prepared my mind for satisfactory results. I could not at first believe there was one-quarter the value enveloped in these black sands. That these sands generally, from productive mines, properly concentrated, will pay \$100 per ton on the average, I have not the least doubt. So much for the experiment of considerable labor made for my satisfaction, but which I give to the public for the reason I engaged the time of Mr. Hanks,

who is working in the interest of the State, and in compliance with my promise to him to do so at the start. Whether these tests will awaken any interest in the minds of hydraulic, drift and placer miners, or not, concerns me but little. I can only say they should. I am now engaged in more extended experiments, and hope in time to solve two important problems: First, how to mechanically and cheaply extract the sands, and not interfere with extensive working. Second, how to practically and cheaply extract the gold. The latter, however, to me, is a more simple problem than the former.

ALMARIN B. PAUL.
San Francisco, Cal., January, 1883.

Notes From Eureka, Nevada.

[From our Regular Correspondent.]

There has been a great deal of comment in regard to the Albion affairs during the week. By many persons the amount of the company's indebtedness has been shrewdly guessed, while others have missed the mark by a great many thousand dollars. I have not been in the mine since my last report to the MINING AND SCIENTIFIC PRESS, but am assured by those who have that there is as much in sight as ever. The new sections of

The Accumulator at the Eureka Con.

Have been set in place. It is expected that the pipes and fittings will be attached and all ready to steam up on Thursday next.

At the Phoenix some of the tributers have been shipping ore, but have not yet got in their returns. It is said that the Jackson will shortly be started up by the company, but of the truth thereof I know naught. Mr. E. N. Robinson has bonded

The Eagle Series of Claims.

Lying southeast from the Jackson, that Joe Potts in his lifetime held to be a branch extension of the Ruby Hill mineral belt. Not sufficient work has been done, however, to determine whether his theory is correct or not. The claims in question are three in number, known as the Eagle, Blake and Connor, each 200 feet wide and 1,500 ft. in length on the lode. If bold iron croppings indicate favorably, it is a good property. Ten men are at work prospecting on the ground. At the bottom of an incline shaft on the Eagle I found iron, sand, clay, spar, and just enough of low-grade ore to swear by. This was at a depth of 27 ft. from the surface on the incline. There is a good double compartment shaft on the Bayard Taylor mine down 150 ft. that is situated within a stone's throw to the eastward of the incline shaft above mentioned, and on this a whim is to be set up. What the plan of operations is I did not learn, but there is some low-grade ore in the mine, and a big cave that has not yet been explored, as I learned from one of the owners three years ago, since when it has been lying idle, with exception of assessment work done on the ground. Indications point to the probability of the shaft being carried down to a greater depth, say to 300 ft., whence a crosscut driven out under the Eagle series would be a good thing to prospect both properties.

The Eureka Tunnel

Is looking about the same as it has been for several weeks past. Ore is being shipped at the rate of eight to ten tons per day that works about \$100 per ton. The output might be increased if the hoisting capacity were equal to removing the waste rock, which is not the case at present. It was intended to enlarge the main shaft and place the new engine on it, but a careful survey of the workings has shown the better plan to be the enlarging of a winze sunk 100 feet west of the main south drift. This is being done, and the timbers are framed ready to set. The advantages of sinking a working shaft and placing the engine at this point are various. The ground is more favorable for sinking, there is already a splendid prospect for ore in the winze, and the ore deposits at the south are dipping almost vertical, but with an inclination towards it. In addition to the advantages named there is a reasonable probability of finding a continuation of the first ore body discovered in the tunnel, which has made off in several directions, but in stringers too small to follow considering the means at hand to do the work. The south drift has been driven to the El Dorado Con. line on a seam showing fine indications for ore, but nothing has been discovered worth mentioning. Yet the ground looks so well that it seems a pity not to explore it thoroughly. It will be done in good time, says the worth foreman, Mr. Wm. Maxwell, than whom a better man could not be selected for the place. Ventilation from the surface is the strongly apparent necessity. It must be had, and how to get it with the best advantages and most profit to the company, is now a matter under consideration.

The Bald Eagle and Pioneer

Mines have been consolidated, the Pioneer people agreeing to furnish an equal amount of capital with the Eureka (Nevada) Silver Mining Company. An English corporation will conduct the business of the company in London; 60,000 new shares will be issued to raise capital for working purposes.

Four men are at work taking out quartz ore from the Republic mine on Prospect mountain. The mine looks favorable. On the Chloride and

Bromide locations, adjoining, assessment work finished last month left them in a very promising condition. Possibly the next assessment work done on these claims will develop some ore in quantities sufficient to warrant further exploration, when doubtless a capitalist will happen on the ground and offer a few hundred dollars for the property, which in any ordinary camp in Colorado he would be ashamed to offer for the same as many thousands. What a shame it is that this, the best mineral section in America, should receive so little attention from

The Moneyed Men of San Francisco.

I will guarantee to any man who will think it worth his while to take me up, that he shall receive \$50 for every time he sinks a hole in the ground to a depth of 10 ft. anywhere (in a limestone formation) within the boundaries of Eureka mining district, and fail to find rock that, upon being assayed, will not be shown to contain silver or gold. We have a magnificent field for legitimate and profitable mining operations, but are greatly in need of the capital required for development purposes. It must, however, come to us in time. The camp is in its infancy, and we have good inducements to offer. On Silverado mountain the Berryman Bros. are daily expecting to strike ore again—this time in a vertical winze, now down 45 ft. below the Diagonal tunnel level.

From the Silver Nugget nine tons of middle-class ore have been shipped to the Richmond furnace for reduction that assayed \$70 per ton in silver, and carried 40% of lead. It also contains silica in such quantities as to make it a very desirable ore for smelting purposes.

Yours truly, M. H. JOSEPH.

Wooden Water Pipe.

One of the best improvements for the good of the city of Ogden is that of the water works, inaugurated in 1881, and continued during 1882. A company, of which the city is part owner, operates the works. Water is taken from the Ogden river at an elevation of nearly 600 ft. above the city, and by means of pipes is conveyed to reservoirs on the bench back of the city. From the reservoirs pipes convey the water to various portions of the city and into residences. In the lower part of the city there is a pressure of 175 ft., ample for extinguishing fires by means of hose. The name of the incorporation is Ogden Water Company, E. H. Orth President and Joseph Stanford Secretary and Treasurer. The company have in use 12 miles of pipe in the mains, besides a large amount of service pipe, 34 city hydrants, 5 public drinking fountains, 2 public horse troughs, and over 200 subscribers using hydrants in residences and places of business. The pressure at the hydrants ranges from 75 to 100 lbs. A patent wooden pipe, wrapped spirally with iron bands, is used, so far giving good satisfaction. The works have cost about \$75,000, and the present revenue is about \$10,000 per annum. The expense of operating is merely nominal. Only a little attention to prevent any clogging at the fountain head and occasionally slight repairs are needed. Besides Ogden river as a source of supply, the company holds water rights in Strong's canyon. The above is taken from the Salt Lake Tribune, and we refer to it at this time to show the practical working of the improved wooden pipe patented by Houton some years since, and of which we gave an extended notice at that time.

SONORA NEWS.—Mr. G. H. Sharp, an old resident of Tombstone, returned from Sonora Saturday, having been absent some months. He left Hermosillo only a few days since, which place he reports improving. There are a good many Americans there, who add to the "push" of the place, if such a term is applicable to a country where everything is done manana (tomorrow). He says the Santa Maria property looks better than it did one year ago. They are doing a good deal of work, and have some ore. About one-half the machinery and lumber for their 60-stamp mill is on the ground, and the remainder in Hermosillo. The San Augustine (Shugart's) mine is turning out well, and he talks of enlarging his mill to keep pace with the production of ore. The ore continues rich. At the Las Delicias mine great developments have been made. They have opened the property in three places, all of which show an abundance of good ore. They have contracted for a 60-stamp mill and large hoisting works. Mr. E. E. Olcott, the superintendent, has returned from Boston, and is again at the helm. Crops along the Sonora river are up and looking well, and there is an air of greater prosperity than for a long time heretofore.—Tombstone Epitaph.

THE Bodie Miner's Union has elected the following officials for the ensuing term of six months: President, Watkin Morgan; Vice-President, Harry Keenan; Recording Secretary, John F. McDonald (re-elected); Financial Secretary, A. E. McMillan (re-elected); Treasurer, John Lawler (re-elected); Conductor, Humphrey Desmond (re-elected); Warden, John T. Read (re-elected); Finance Committee: Morris O'Connor, Roderick McDonald and John S. Long; Board of Trustees: M. Cullinan, S. P. Gallen (re-elected), John Prior (re-elected), Frank Bowden and D. E. Leahy.

MRS. MARY DOUGLAS has located a ledge known as the Buffalo claim, bounded south by the Empire mine, in Calaveras county.

Mining Laws.

Cutting Timber on Mining Claims.

The following letter to the Prescott (Arizona) Courier, from C. Y. Shelton, will be of interest to all miners:

It seems that in most large mining camps, and sometimes small ones, there are usually one or more persons who, in their judgment, know more law than others, and contend that if more than one lode exists in a mining location that outside parties have a right to go on, or enter, locate and hold one of the lodes; or, that they have the right to cut timber off it; or, that they have a right to build and reside on it; or, that they have a right to placer mine on it—all of which, if not intentionally, is calculated in its nature to create disturbance; or, that this or that man has not done his assessments; or, that he can't hold this, that or the other. Of course, all or most miners who want to know are acquainted with that particular section headed "Locators' Rights of Possession and Enjoyment," which gives them "the exclusive right of possession and enjoyment of all the surface included within the lines of their location, and of all veins, lodes and ledges throughout their entire depth, the top or apex of which lies inside of such surface lines, extended downward, vertically, although such veins, lodes or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side lines of such surface locations. But their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward, as above described, through the end lines of their location, so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges. And nothing in this section shall authorize the locator or possessor of a vein or lode which extends in its downward course beyond the vertical lines of his claim to enter upon the surface of a claim owned or possessed by another."

And the following decisions are just received from Washington:

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
WASHINGTON, D. C., Dec. 9, 1882.

C. Y. Shelton, Esq., Walker, A. T.—SIR:—I am in receipt of your letter without date, in which you state that all the mining claims in your vicinity are 1,500 ft. in length and 600 ft. in width, and a large number of them contain more than one vein; that it is rumored that information has been received from Washington that the original locators could only hold one vein or lode within the boundaries of their respective claims, and that outside parties could go upon such claims, locate and hold one of the veins. You ask if this is true, and whether outside parties have a right to enter upon claims properly located and cut timber therefrom, for building or other purposes, or reside thereon, or work the same for the placer mineral.

In reply I have to state, by the Act of July 9, 1865, the miner could only acquire and hold one lode or vein within the limits of his surface location; but the act of May 10, 1872, gave the locator of a lode claim additional rights; it granted to him a specific quantity of surface ground, the lode located and all other veins or lodes the apices of which lie within the surface lines of his location. Such veins are not subject to location or relocation so long as the original locator complies with the law; nor would a stranger be authorized to reside upon the claim, or cut timber standing thereon, without the consent of the owner; and any forcible attempt to do so would be a trespass. The owner's remedy would be in the local courts. See letter of Secretary of Interior to this office, under date of Sept. 30, 1882. (Washington Law Reporter, p. 636.) The locator of a lode claim acquires the right to all surface ground embraced within the exterior boundaries of his location, not previously reserved or appropriated, and the discovery of placer mineral thereon would not authorize an outside party to go upon the claim for the purpose of mining thereon. Very respectfully,

N. C. McFARLAND, Commissioner.

Now, some seem to think that the woods are free, and that they have a right to cut timber, reside, or placer mine where they please; defy law and man; take a part of that which belongs to others, or influence some one in that way, simply because they begrudge the law-abiding citizens their property. Such law violators are no acquisition to a mining community, and should look more to their reputation or apply for walking papers.

THE MINES OF CHIHUAHUA.—The Chihuahua Mail says: That an error exists in presuming that the silver, gold and copper mines which supplied the rich ores, the slag of which is all along the Chihuahuariver for miles, are far away from this city, we know to be true. It is estimated that there are two and a half to three million tons of this slag. We cannot, perhaps, see over twenty per cent. of it. Floods and dust have carried much of it away or hidden it from sight. We verily believe and have our reasons for believing that the oldest and best mines of all this Republic are within a radius of thirty miles of this State capital and many of the best within twelve miles of the city, and that hundreds of bonanza veins will be claimed and developed in the next six months on this ground.

BEFORE the end of January Vanderbilt starts for California with his sons and daughters and their wives and husbands. It will be purely a pleasure trip.

MECHANICAL PROGRESS.

Judging by the Fracture.

Whenever a line of shafting breaks, a boiler explodes or a rod or link snaps, an examination of the fractured surface of the iron is made. The inferences drawn from the examination are sometimes very unfair to the maker, at other times to the consumer, although the examiner himself would do no injustice to either. These unjust conclusions may frequently be ascribed to the prevalence of crude notions concerning the appearance which the fracture should present. Many suppose that if it is not fibrous, but crystalline, then the metal was unfit for use, and they charge the foreman or engineer with having subjected it to injurious and unnecessary strains which rendered it worthless at the time of the accident; or they enlarge the maker with having furnished metal of so poor a quality that it was unable to withstand extraordinary wear and tear. These charges are grave; they injuriously affect professional character, and they should be made with extreme caution, for the condition under which iron may assume and maintain a fibrous or a crystalline structure are yet matters of profound scientific inquiry. For a long time they have engaged the attention of the best engineers, who, recognizing the difficulties involved in the question, have been slow to form and to utter positive convictions.

The appearances of fractures being due to the positions assumed by the molecules of iron at the places. When the metal is fluid any change in their position may be accounted for. Thus, when pouring molten metal into a mold, that which cools rapidly will when broken exhibit a different fracture from the rest. It will be crystalline and lustrous, indicating hardness and brittleness; while parts of the same casting which cooled slowly will exhibit a dull granular fracture, and be found comparatively soft and tough. Here the fluidity of the mass readily permitted its molecules so to arrange themselves under the varied conditions of temperature as to impart to it the different qualities.

When the iron of which good shafting, boiler plate, rods or links are made leaves the fashioning it is of uniform quality. It remains solid while in use, and any molecular changes must be attended with difficulty, and be produced only by powerful external agencies. The opinion that the severe cold of our winters changes fibrous iron into crystalline, although generally entertained outside the profession, is received by engineers with many grains of allowance, and some of the best of them reject it altogether. Indeed, they have great reason to doubt whether iron, as it comes from the rolls or the hammer in the form of bar, plate or rod, has a fibrous structure. Take the rod to the draw bench, and draw it into wire in the usual way. You impart to it a fibrous structure; and so do all machines for testing tensile strain. The test pieces when drawn asunder exhibit fibrous structure, and this is assumed to show that they possessed such structure before they were subjected to the strain; but it proves nothing of the kind. As in wire-drawing the tendency of the operation is to cause the molecules to take the form of fiber; but had another method of rupture been employed the same pieces would have appeared crystalline, and by the popular standard been adjudged inferior. Nick them round, as is frequently done in the rolling mill, and, laying them flat between two supports, subject them to the force of a falling weight. They will break squarely off, and not a trace of fiber can be detected in the fracture. Had the same bars been tested in another familiar way, by making a nick on one side only, and then with a hammer bending them until they broke, the fracture would have been fibrous, the bending being so far a wire-drawing process as to arrange the molecules in fine lines. Whether the fracture be fibrous or not depends upon how the rupture came about, and to condemn iron because its fracture is crystalline, without taking into account the method of rupture, is most reprehensible. In thus pointing out the untrustworthiness of the fracture test we do not leave the questions involved without other and exact means of settlement. Poor iron is so because it is impure. One per cent. of carbon, silicon, sulphur or phosphorus seriously impairs the quality of iron, and the presence or absence of those elements can be ascertained with the greatest nicety by means of chemical analysis.—*Dr. A. S. Kennedy.*

Iron Rust as a Cement.

Most mechanics in iron have tested the cohesiveness of iron rust as a cement in the use of the ordinary joint packing made from iron filings or drillings, sal-ammoniac and sulphur, combined with water. The salt and sulphur are simply agents to rapidly and thoroughly oxidize the iron, which becomes, in its oxidized state, a cement. The effectiveness of iron rust as a cement is not confined to its action between iron surfaces; it is seen in the red sandstones, which consist simply of sand held in mass by iron rust, that gives it, also, its reddish hue, and in the common red bricks, which derive much of their cohesiveness, as well as their color, from the iron they contain. The process of the formation of red sandstone can be seen by the careful observer on some of our New England beaches, where this kind of rock prevails in the cliffs and the beach shingle. The slight winnows of sand thrown up by the increasing waves in some high tide may be found gradually hardening into stone under the combined action of sea, water

and air; and fragments may be picked up in all stages, from the crumbling sand, the cohesiveness of which will not bear its own unsupported weight, to the hardened shingle, which is essentially rock. And yet this sandstone, when quarried many miles from the sea, from beds that must have been deposited many centuries ago, retains so much water that it must be seasoned like wood before it is ready for building use. And this water is probably salt, for its effect on iron brought in contact with it is essentially the same as that of salt water on iron under any other circumstances.

A notable instance came under the writer's observation several years ago. A balustrade of iron bars, or balusters, seated in red sandstone, was taken down, and that portion of the iron that was removed from the stone was either a fibrous powder or a few strings of iron. In this instance the gradual disintegration of the iron by rust had been going on for more than 40 years, but it had been going on. The imbedding of the iron into the solid stone, protecting it from the weather, could not protect it from the moisture, probably salt moisture—in the stone. All of this disintegration could not be attributable to the absorption of moisture by the stone, as a portion of this balustrade was entirely within an inclosed building. If sulphur imparts activity to the process of oxidation of iron, when used as a component of the ordinary "rust cement," it is evident it is wholly unfit as a filling to seat iron into stone, especially into red sandstone. Lead is, perhaps, as safe as any material, as, while it will not be attacked by moisture to any appreciable extent, it will defend the iron from destruction.

In witnessing the operation of removing a heavy iron fence recently, which it was desirable to preserve for re-erection, it was noticed that, while the palings could be easily removed from their leaded seats in the stone base, it was necessary to start them from their connection with the horizontal bars, or rails, by sharp and repeated blows of a hammer. The cross section of the palings was a right-angled cross, or an X, and their bearing against the corresponding holes in the rails was, as carried around the outside, about four inches, by three-quarters of an inch in depth, or thickness of rail, making an area of bearing between the two surfaces of about three inches. Yet this comparatively slight area, as compared with the much larger area in the stone, offered a much greater resistance, showing the cohesive force of simple oxide of iron.—*Cotton, Wool and Iron.*

Shop Practice.

I well remember my first visit to a machine shop, and how I was impressed with the slowness of the work in process—the slow revolving of the shaft or pulley in the lathe, with no perceptible forward movement of the tool; the slow dragging of the planer bed, with a faint show of hurry on the back motion. This, doubtless, is a common impression, made on all who see such work for the first time. Having watched the lathe and the planer so long, it would seem that this apparent slowness would be less noticeable, but still I see it. Once in a while the brisk movement of five or six feet a second attracts attention, and I instinctively look to see if the tool stands the speed, and drop a word in recognition of the get-up of the man in charge. The other extreme of speed is more frequently met, and sometimes it is necessary to use a magnifying glass to see if things are really moving.

It is often annoying to notice this disregard of time on the part of the workmen, and yet I feel a degree of sympathy that prompts a word of apology. There is no doubt but that this everlasting slowness has become a part of the machinist's education.

He has come to fear nothing as much as the possibility of dulling a tool, seeming to feel much as one does when at work in the country, with the last sound chisel, and a mile or more from a grindstone. He actually seems to think that it is a part of his business to be slow.

Just to make the contrast striking, go into a brass shop and notice the way the lathe hand handles his calipers, scraper or burnisher, and see how he jerks the shifter from side to side; or, into one of our modern cooper shops, and see the man or boy put on truss-hoops, or paint barrels at the rate of two a minute. Then go back to the machine shop and see the sleepy lathe hand enjoying a good loafing job, with the slow feed and speed on that he dares to adopt. Or, another setting his calipers the fourteenth time to know if he dares to try the thing to see if it will fit.

There are some exceptions to this class of close workmen, and a few who look for the shortest way round, and really seem to try to see how much work their lathe or planer will do, in place of how little.

It would be well if master machinists would have an active eye to the active men, and encourage their efforts, at least by recognition if not by advanced pay, which would be the strongest incentive to an emulation of their example on the part of others.

I was once acquainted with a lathe hand who knew how to use hand tools. He was naturally kept at the ornamental turning of irregular shapes, and could turn out three times as much of it as anyone I ever knew, notwithstanding he spent much of his time at a grindstone; in fact, he had one of these useful articles placed very near his lathe.

I hope none of my brother "chips" will take offense at anything I have said. I would have him know his is not the only slow trade in the world.—*Cor. of American Machinist.*

SCIENTIFIC PROGRESS.

Practical Application of the Lenkoscope.

In a recent issue of *Engineering*, London, we find an account of a number of experiments by Dr. Koenig on the quality of different kinds of light by means of the lenkoscope, an instrument of his invention. It consists of a rhomboid of calc spar, a quartz plate and a Nicol's prism. When a ray of light enters the spar it is split into two rays, polarized at right angles. These traverse the quartz and Nicol. When analyzed they show two spectra of absorption bands, and the peculiarity is that, where the bands occur in one, the other spectrum is of pristine brightness, so that the two spectra overlaid give a continuous spectrum. The number of bands is increased by increasing the thickness of quartz, and they can be shifted by rotating the Nicol. It is possible, therefore, by rotating the Nicol to make the colors in each spectrum produce white light together. When different kinds of light are examined by the instrument, different amounts of rotation of the Nicol are required to bring the two spectra into conformity, and the angles of rotation are a gauge of the color-quality of the light examined. According to the results communicated to the Physical Society of Berlin, Dr. Koenig finds that the angle for steampar candles is 71.20°; for gaslight, 71.5°; for electric arc light, 79°; for magnesium light, 86°, and for sunlight, 90.5°. For burning phosphorus and the Drummond limelight the angles were between gas and the electric light. It thus appears that the magnesium light more closely resembles sunlight than that of the electric arc, a result confirmed by the fact that the aniline dyes, hardly distinguishable by gaslight, can all be distinguished by the arc light, except a few "bronzes," and even these are clearly distinguishable by magnesium, as by sunlight. Dr. Koenig has also tested Swan and Edison incandescence lamps, and finds that the luminosity increases at first in a much greater rate than the current increases. Doubling the strength of current very largely increases the luminosity. The highest angle reached was 78°, or very nearly that for the arc lamp. These researches of Dr. Koenig are of considerable interest, more especially as so little has been done in this direction.

BISULPHIDE OF CARBON LENSES.—PROPORTIONS OF LENSES.—We say in reply to a correspondent that we do not know of any telescopes with bisulphide of carbon correcting lenses having been made of late years. They were never a success. It requires the grinding and polishing of four surfaces for the correcting lens, and as there are no formulas, to our knowledge, for the bisulphide, you will have to make an experimental trial. For your front glass you may make the curves one to six or nearly a plano-convex flat side next the eye, the radius of shortest curve about six times the diameter of the lens. For the correcting lens the diameter should not be less than one-third the diameter of the front lens. Its general form should be plano-concave; and as the dispersive power of bisulphide is more than three times as great as crown glass, its refractive power being about 50% greater, you may make the side next the object glass plane, and the side next the eye convex on the inner side and plane next to the eye, if convenient to do so. This will require only one curve to be altered for final correction. To start, make this curve the radius of the first surface of the front lens, and place the lens about one-third the focal length of the object glass from the eye.

GUM ARABIC IN CERTAIN CHEMICAL REACTIONS.—Jules Lefort and P. Thibault find that in dilute solutions gum linders the precipitation of metallic sulphides. In concentrated solutions, or when the proportion of gum is small, there is a precipitation more or less incomplete. The precipitation of the metallic oxides is also prevented whilst in the presence of gum, quinine, cinchonine, morphine, strychnine, brucine and veratrine are not precipitated by the usual reagents, ammonium phospho molybdate, potassiummercuric iodide and tannin. The gum does not dissolve the various precipitates formed or prevent their formation, but merely holds them in suspension. These results have a certain physiological importance. Most inorganic fluids contain glutinous bodies, and it is hence possible to understand the simultaneous presence in a soluble state in the animal and vegetable cellules of compounds capable of acting chemically upon each other. In analytical operations gum and analogous bodies must be removed before certain determinations can be effected.

POTELINE.—M. Potel recently submitted to the French Society of Encouragement a new substance, named after himself, "Poteline," and which appears to be susceptible of numerous applications. It is said to be a mixture of gelatine, glycerine and tannin, and is, according to the inventor, absolutely impermeable to the air. When warmed it becomes liquid, or nearly so, and may readily be worked into different shapes. M. Potel is reported to have made corks of it which form an economical substitute for metallic capsules, securing a hermetic closing, and to have used it as a coating to preserve meat. At a temperature of 112° it becomes almost liquid, and when applied to meat will, it is claimed, kill the germs of putrefaction and prevent the entrance of new germs. According to the inventor, meat thus treated will retain all its freshness for a considerable length of time.

Cheapened Aluminum.

The improved process of producing the metal aluminum, recently reported from England, does not cheapen the product anywhere near enough to bring the metal into serious competition with iron. The inventor, Mr. James Webster, of Hollywood, near Birmingham, Eng., claims, however, to have found a way to solder and weld the metal. If this claim is true, and the methods are practicable, the improvement is likely to greatly extend the usefulness of the "coming" metal.

Mr. Webster's process of reducing the metal is described as follows:

A given quantity of alum and pitch, which are first finely ground, are mixed together and placed in a calcining furnace, by which means 38 per cent. of water is driven out, leaving the sulphur, potash and alumina with oxide of iron. The calcined mixture is then put into vertical retorts, and steam and air are forced through, which leaves a residue of potash and alumina only. This residue is afterwards placed in a vat filled with warm water, which is heated with steam. The potash is thus leached out, and the alumina left as a deposit. The potash liquor is then run off, boiled down, while the alumina precipitate is collected in sacks and dried. It is then ready for making chloride of aluminum. The alumina deposit thus obtained contains about 84 per cent. of pure alumina, while that which is obtained by the old process of precipitation has only 65 per cent. Mr. Jones, the Wolverhampton borough analyst, certifies that the constituents of Mr. Webster's alumina deposit are as follows: Alumina, 84.10; sulphate of zinc, 2.08; silica, 7.40; water, 4.20; alkaline salts, 1.62. In order to complete the process and convert it into aluminum, the chloride of aluminum is treated with sodium, in order to withdraw the metal. Aluminum is afterward alloyed with copper, silver, and other metals. It is used for the manufacture of bismuth bronze, aluminum bronze, or any other alloys.

A CURIOUS PHENOMENON.—The Virginia *Enterprise* gives the following particulars in regard to a tunnel that resents being a tunnel, and insists upon being just the opposite. Its location is Castle district, at a point about five miles north of Virginia City. It was run about four years ago into the side of a steep hill, and was originally about 40 ft. in length. When in about 15 ft., the tunnel cut into a soft, swelling clay, very difficult to manage. After timbering and striving against the queer, spongy material till it had been penetrated some 25 ft., the miners gave up the fight, as they found that it was a losing game. Being left to its own devices, the tunnel proceeded to repair damages. It is very plainly shown that it resented the whole business, as its first move was to push out all the timbers and dump them down the hill. It did not stop at that, but projected from the mouth of the tunnel a pile of stopper of clay the full size of the excavation. This came out horizontally some eight feet as though to look about and see what had become of the miners, when it broke off and rolled down the slope. In this way it has been going on until there are some hundreds of tons of the clay at the foot of the hill. At first it required only about a week for a plug to come out and break off, then a month, and so on till now the masses are ejected but three or four times per year, yet the motion continues, and to-day the tunnel has the better of the fight about four feet.

SOAP MANUFACTURE.—H. Heckel has obtained a German patent for the manufacture of soap without loss of glycerine. The practice at present is to saponify the fats with alkalies without any previous treatment of the grease, for the purpose of decomposing it. The result is a slow saponification, and all the glycerine that does not remain mechanically suspended in the soap is carried away in the alkaline solution and lost. The design of Heckel is to prepare the fats for instantaneous saponification and economize all the glycerine. The glycerine is first extracted from the fat in its neutral condition, by the direct action of steam and water under a pressure of 75 kilos. The whole process of soap making is abridged by the system, and it is claimed that the soap itself is superior. A digester with diaphragm and rotary pump form the special apparatus.

A LATE NUMBER OF THE Idaho Statesman says: "The activity of volcanic action in the Snake river lava beds, near the line of the Oregon Short Line railroad, is driving many of the graders from the work. In an area of about 22 square miles, at short distances apart, smoke and flames of a peculiar odor, color and shape issue from the chasms and seams in the lava. The irritating sulphurous vapors in themselves cause many to quit work, while the unusual agitation of the boiling springs and the general commotion all over the fields of lava has caused a superstitious fear to take hold of many of the railroad hands, and they are leaving the section terror-stricken. The whole area has the appearance from a distance of being on fire."

A NEW KIND OF ALUM, under the name of double alum, has been introduced in the German trade. It is a transparent sulphate of alumina, but has a larger proportion of the latter than usual, and is free from iron and acids. For many industrial purposes, such as the preparation of paper, etc., it will, it is claimed, present some advantages.

MINING SUMMARY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
				Feb. 12.	May 5.	D. B. Chisholm	327 Pine st.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
				Feb. 12.	May 5.	D. B. Chisholm	327 Pine st.

bion Con M Co	Nevada	12	50	Jan 10	Feb 13	Mar 5	D B Claiborne	327 Pine st
pbpa Hy Grav M Co	California	4	10	Jan 8	Feb 15	Mar 7	J Ireland	216 Snaome st
			30	Jan 12	Feb 10	Mar 12	E M Hall	327 Pine st

genta M Co	Nevada	14	30	Jan 13	Feb 15	Mar 12	W H Wataon	302	Montgomery st
ta S M Co	Nevada	24	25	Jan 4	Feb 8	Feb 27	G W Sessiona	309	Montgomery st

Central Con M Co	California	10	10	Jan 17	Feb 21	Mar 13	W H Watson	302 Montgomery st
Central Con M Co	Nevada	9	10	Jan 18	Feb 21	Mar 13	W H Watson	302 Montgomery st
Central Con M Co	California	11	05	Jan 23	Feb 24	Mar 21	A B Paul	328 Montgomery st

on Imperial M Co	Nevada	18	05	Jan 3	Feb 8	Mar 1	W E Dean	308 Montgomery st
ould & Curry S M Co	Nevada	44	50	Jan 10	Feb 15	Mar 8	A K Durbrow	309 Montgomery st

Grand Prize M Co	Nevada	12	25	Jan 11	Feb 12	Mar 5	B M. Halt	327 Pine at
Grand View Con M Co	California	1	05	Dec 16	Feb 14	Mar 14	W H Pentfield	106 Leidesdorff st

ale & Norcross S M Co	Nevada	76	£0	Jan 10	Feb 14	Mar 7	J F Lightner	309 Montgomery st
Monday M Co	California	7	1 00	Dec 2	Jan 12	Feb 7	W J Taylor	310 Pine st
						Feb 5	W J Taylor	310 Pine st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS

atic Con M Co	Nevada	5	05	Dec 21	Jan 29	F B	D Wilder	328 Montgomery st
atrix Divide M Co	California	7	20	Jan 22	Feb 26	Mar 17	M D Kent	330 Pine st
ommonwealth Con M Co	Nevada	5	25	Jan 12	Feb 15	Mar 8	F B Hubbard	31 Montgomery st
on Amador M Co	California	4	01	Dec 31	Feb 2	Feb 10	F B Labbam	810 Pine st
on Calaveras Gravel M Co	California	11	05	Dec 12	Jan 26	Feb 7	H Kunz	209 Sansome st
ata Buena Con S M Co	California	4	00	Nov 3	Jan 11	Feb 10	R N Brooks	609 Sacramento st
ceptor-Shirley W & M Co	California	7	10	Dec 31	Jan 26	Feb 10	J H Stewart	215 Sansome st
on Arizona	Arizona	3	02	Dec 11	Feb 16	Mar 7	J H Sayce	330 Pine st
oreahoe M Co	Arizona	3	02	Dec 27	Feb 2	Jan 21	J H Sayce	330 Pine st
arrington M Co	California	4	05	Dec 6	Jan 9	Jan 31	O C Miller	408 California st
on Lake H M Co	California	15	01	Dec 26	Jan 29	Feb 10	E Hart	331 Montgomery st
on California	California	15	15	Dec 13	Jan 19	Feb 7	D B Chisholm	327 Plus st
on Arizona	Arizona	2	20	Dec 23	Feb 3	Feb 27	J L Fields	300 Montgomery st
ed Cloud Con M Co	California	11	2	Dec 2	Jan 10	Feb 5	W J Taylor	330 Pine st
ed Hill M Co	California	7	05	Dec 2	Jan 10	Feb 5	E Hart	328 Montgomery st
on Pacific South M Co	Nevada	1	10	Dec 26	Jan 30	Feb 20	E M Hall	327 Pine st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
San Amador M Co	California	F B Latbam	310 Pine st	Annual	Feb 1
Father De Smet Con M Cn	Dakota	H Deas	303 Montgomery st	Annual	Feb 1
Jackson M Co	—	R W Heab	318 Pine st	Annual	Feb 1
ro M Co	California	W Stuart	320 Sansome st	Special	Feb 1
Alphur Bank Q M Co	California	L Hermann	220 Sansome st	Annual	Feb 1
Wide Awake Pros & M Co	Arizona	C Hildebrandt	cor Bush & Kearny st	Annual	Feb 1

LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Adie Con M Co	California	C W Sessions	309 Montgomery st	25	Nov 15
Atwater Con M Co	California	D C Bates	309 Montgomery st	25	Jan 1
Continuation Con M Co	Arizona	D C Bates	309 Montgomery st	25	Nov 25
Constock M Co	Nevada	J W Pew	310 Pine st	10	Jan 15
Constock M Co	Nevada	J W Pew	310 Pine st	25	Jan 15
Corbajo Belle M & M Co		Wm W Ellis	309 Montgomery st	50	Jan 15
Deasant Valley M Co	California	E E Elliot	327 Pine st	75	Dec 15
King Con M Co	Arizona	J Nash	315 California st	6	Jan 15
McQuinn Con M Co	California	Wm Ellis	309 Montgomery st	66	Jan 15

Mining Share Market.

The Tehichepa Disaster.

Before daylight on the morning of Saturday, Jan. 20th, a train of cars left standing without a locomotive near the summit of the Tehichepa pass, on the S. P. R. R., rushed down the grades and around the sharp curves until a part of the train jumped the track and was instantly wrecked; almost immediately the cars took fire and were consumed. Many were killed by the shock, and others perished in the flames, unable to extricate themselves from the wreck. It was the most appalling railway disaster ever occurring on the Pacific coast. The following is the list of the killed and wounded :

L. Wethered, dead; Major Larrabee, dead; Capt. A. L. Waterhouse, wife and two children, wounded; Miss Ida Brown, wounded; Mrs. J. K. Brown, wounded; Lawrence, the porter, dead; B. A. Schlegel, dead; Mrs. Cassell, dead; H. A. Oliver, dead; Miss M. E. Squires, dead; Mrs. Hatch, wounded; Gov. Downey, wounded; Mrs. Downey, dead; Wright, the porter, dead; Thomas Keegan and F. Grompf, both dead; C. K. Pierson, express messenger, dead. [Mr. Pierson was the son of the Utah correspondent of the MINING AND SCIENTIFIC PRESS. —EDS. PRESS].

This makes only 12 known to be dead, but several others who boarded the train at the way stations are believed to have perished.

Much mail matter was burned, including the edition of the RURAL PRESS mailed to subscribers in the southern counties. Unfortunately, we are unable to replace these papers.

THE OSTRICHES AT WOODWARD'S GARDENS are attracting much attention, and they are

well worth a visit. There are several varieties of the ostrich, and the specimens on exhibition afford a rare opportunity for studying the characteristics of this wonderful bird—the largest of all the feathered kind now in existence. Two varieties—the Emu and the Cassowary—have been on exhibition at Woodward's for some time. These birds, however, are much smaller than those which recently arrived here from South Africa via New York. The latter are the true ostrich, being much larger and differing much in other respects from the smaller varieties. The males of the variety recently arrived sometimes reach 300 pounds in weight, and stand eight feet in height. There are 22 of these noble birds now at Woodward's, which have been brought here to be domesticated for their feathers and eggs. Some varieties of the ostrich when young are very palatable as food. The present is a rare opportunity for seeing them which will not be continued long, as the birds will soon be removed to the "ostrich farm," which is being prepared for them in the interior of the State. The last China steamer brought to Woodward's another very interesting bird novelty—known as the Mandarin duck. This bird is quite rare and specially noted for its beautiful plumage. It is well worth a visit to the Gardens to see it.

A FULL feeling after meats, dyspepsia, heart-burn and general ill health relieved by Brown's Iron Bitters.

California.

AMADOR.—Amador *Ledger*, Jan. 20: The Oneida company has put a number of men to work in preparing the ground in the neighborhood of the mine for sluicing. It is said that there is some first-class gravel which has never been worked, some of it prospecting as high as 15 to 20 cents per pan. The intention is to run it through sluice boxes, employing three gangs, 4 men to each gang, in shoveling it in. The operations are carried on under the direction of A. Yelmini.

OCURE.—This claim is owned by the Page brothers, and is located one and a half miles west of Plymouth. We are informed that in the last two weeks the nice little sum of \$1,500 was taken out by pounding in a hand mortar the richest of the ore. It bids fair to become a famous mine.

MISCELLANEOUS.—The Cleveland placer claim at Volcano has been running steadily for three months past, employing 5 men. The work mainly consists in taking out pay dirt, and getting it on the dump preparatory to washing, when the water supply enables them to do so. There are 4 owners in the claim. The gravel prospects handsomely; as high as \$2 has been taken from a single pan.

KELLY.—This quartz mine, three and a half miles above Volcano, is working constantly, with the small mill belonging thereto. This and the Downer mill, we believe, are the only quartz mills in operation in Volcano district at the present time.

VOLCANO.—Amador *Dispatch*, Jan. 20: The weather has been so cold and frosty that all the creeks are dried up, so that it is impossible for grave miners to work their claims. All the quartz mines around are still at work. The Acme mine is working steady. The Downs mine is getting out very rich rock. The mill is running day and night to its utmost capacity. The mines in Pioneer district are all getting out rock.

COPPER.—The Campo Seco Copper Company has concluded a shipment of 500 tons of copper, and now has under construction extensive smelting works. Fifty tons of castings are now on the ground for that purpose. There are at present 30 men employed, but the number will be doubled as soon as the present works are completed. The body of ore is 25 ft. in thickness, and contains about 15 per cent. of copper.

BUTTE.
THE PERKSHACKER.—Butte *Record*, Jan. 20: We received a call last evening from Mr. John Barrett, a long-time resident of Magalia, and one of the owners of the celebrated Perckshacker mine near the

ers in the celebrated Pershnucker mine near that place. He still adheres to his opinion expressed long ago, that it is one of the best mines in the State. Just now they are not drifting in the mine, for the reason that the cold weather formed ice in their ditches, which prevented them with power to run their pumps, and, while waiting that of Arctic and other obstructions to the free passage of the water, the pumps were allowed to lie idle, and the mine was flooded. They expect to have it pumped out in a short time and go ahead again with their daily work of taking out numerous specimens of coarse gold, besides ounces of fine dust.

CALAVERAS.
WEST POINT.—Cor. *Calaveras Chronicle*, Jan. 20
The Champion mine is being worked; prospects are
favorable. Wm. Henderson and Wm. Jones have
the management of the brakes. From what we can
learn good ore is being taken from the Carlton mine.
New machinery has been put on the mine, and work
is prosecuted night and day. Mr. Baker and Mr.
Richards run the engine. The Henry mine is shut
down at present. It is one of the leading mines in
this vicinity. The Star of the West, Tom Payne
Pride of Bummerville, Water Lilly, Gouldston and
several other mines are not being worked at present.

THE LEAVITT MINE.—We were shown some very rich specimens of quartz one day this week which were taken from the Leavitt mine, situated near the Big Bar bridge on the Moquelumne river. The rock was taken from a depth of 40 ft. and the vein at this point is large and well defined. Considerable work has been done upon the mine in the way of prospecting.

EL DORADO.
UNFAVORABLE.—Georgetown Gazette, Jan. 20

This winter so far has been very unfavorable to our mining interests. The sluice claims have nearly all been idle. Owing to the freezing weather of the past few weeks the California W. & M. Co.'s ditches have been very short in their water supply. Our mills have been shut down on this account. About the only work in the mining line being done is tunneling, drifting and sinking. General stagnation now prevails. Very little money is circulating, and many of our people are closely pressed. Financially, this is the worst season ever experienced here.

GREENWOOD.—Owing to the protracted spell of dry, cold weather dullness prevails. Mining operations are almost entirely suspended for lack of water and until the wished-for rains come news items, like every other benefit, will be scarce.

CRESCENT MINE.—*Greenville Bulletin*, Jan. 20. The pumps were started up last Friday and are working very well, lowering the water in the shaft 1 ft. per day. At this rate it will be but a short time till the Ophir vein can be reached from the shaft when work can be done to much greater advantage than at present. It is the intention of Mr. Davis to continue the drain tunnel around and above the shaft. When this is done it will intercept and carry off a large amount of water that now finds its way into the mine, and to that extent will reduce expense. The ore continues to be as rich as before, and the body increases in size with further development. Eight stamps are now running, 4 more having been started up on last Friday. Still other batteries will be put to work as soon as new ground is opened up, till the whole milling capacity shall be fully employed.

GRANITE BASIN NOTES.—Cor. Plumas National, Jan. 20: Basin froze up for the winter, and 2 ft of snow. Nothing doing. The parties that attempted to buy in with Swan & Ament have so far failed to

meet their agreement, by way of putting in the promised sulphur works and paying the amount stipulated in the agreement. So I think the sale a dead letter. See & Jolly are busy getting out good rock in their upper mine. They undoubtedly have two splendid little ledges that keep their mill busy during the summer. The Minto mill lies idle. If it would turn water so they could throw out the pipes, they would start the mill up and run through some 60 or 80 tons already stoped out, but the circles are about 7 ft too long. There are a few placer mines in this section of the country, but at present the outlook for water is bad, and some of them will have to use the old rocker in the spring.

SAN BERNARDINO.

THE PROVIDENCE MINES.—San Bernardino Times, Jan. 20: The Bonanza King Con. Mining Co. smelt is the most complete one on the Pacific slope. The mill is 10 stamp—with power for 20—crushing capacity, 30 tons per day; stamps, 865 lbs.; 6 Boss' Cone pans 5 ft. 1 clean-up pan, 3 9-ft settlers and 10-ton Blake's improved rock breaker. The engine is a marvel of beauty and finish.

ILLINOIS SHIPMENTS. The pulleys for the pans were geared too high and the connecting water pipes from the springs to the mill got out of fix, and other little drawbacks, very little being done until January, since which time the Bonanza mill has been turning out bullion at the rate of 60,000 ozs a month, or \$2,000 a day.

STRIKES. Several new strikes have been made in the mine, notably one from No. 2 winze, running diagonally across the main ledge several feet wide. This find is liable to connect the Bonanza with the Kattler mine.

SAN DIEGO.

NEW MINING DISTRICT.—San Diego News, Jan. 20: At a miners' meeting called and held at the headquarters of the Menifee Mining Co., San Diego county, Cal., on Jan. 10, 1883, for the purpose of forming a new mining district, C. Herketh was called to the chair and L. M. Wilson appointed Secretary, when the following proceedings were had: John E. Stuart, M. Probst, Beebe J. Denning and J. H. Binet were appointed a committee to draft a set of by-laws to govern the district, and reported as follows: Sec. 1. "This district shall be known as the 'Menifee Mining District,' and is bounded as follows: Beginning at a point where the old sheep camp wash intersects and is crossed by the California Southern railroad, and about three-fourths of a mile northerly from what is known as Cottonwood canyon, and running easterly along said old sheep camp wash to the old sheep camp; thence due northeast to the main wagon road leading from Lamb's blacksmith shop to Pinnacle railroad station; thence easterly to Coyote springs; thence easterly to San Jacinto toll-gate; thence southerly to Ticknor's store; thence south-westerly to the Temecula railroad station; thence northerly along the line of the California Southern railroad to place of beginning."

SHASTA.

FROM WHISKYTOWN.—Cor. Shasta Courier, Jan. 20: Andrew & Kesler have a quantity of quartz ready to mill, but Johnnie says there is not enough water to drink, let alone run an arrastra. At Mad Ox there are 400 tons of quartz on the dump. Several days ago they made a short run of 18 tons, but had to shut down on account of scant water supply. The new mill works like a charm. It is a great credit to the late energetic superintendent, Mr. Farham, under whose supervision it was constructed. Zent & Butler are engaged in the development of their mine, and are keeping a sharp lookout for nuggets. Low & Beagle are opening up a ledge above the Mad Ox. Harrison & Jackson present the appearance of prosperous miners. Bell & Mahoney have leagued together to assault quartz upon Grizzly. J. Stroud has purchased the interest of Arnett & J. Williams on Dog Gulch.

SIERRA.

QUARTZ.—Mountain Messenger, Jan. 20: Stephen Spencer's quartz mill, situated below the Ruby mine, is all ready to run when water comes. His men are at work getting down quartz.

BIG.—The old Union claims at Gibsonville continue to pay as well as ever. An immense deposit of rich gravel has been tapped, and the extent of it is not yet known.

JEROME YORK has got his arrastra in Slug canyon running. The late cold snap has interfered with his work by shutting off the water. Mr. Schofield, of the North America mine, is running ahead in hard rock, but expects to complete his tunnel in about 7 weeks. He has prospected the ground by shaft, and is now running a tunnel to work the ground.

TRINITY.

DEADWOOD.—Trinity Journal, Jan. 20: Mr. Frick was in this week, and from him we learn that Frick & Davis have their lower tunnel in about 200 ft on the mine recently purchased from Gibson & McDonald Bros., and that they expect to strike the lode in 80 ft more. This will open the mine 80 ft lower than it has been worked and about 160 ft below the surface. In running this lower tunnel a small but very rich stringer was cut lately. Other mines in the Deadwood district are reported as not only "holding out," but constantly improving.

TUOLUMNE.

THE HESLER.—Tuolumne Independent, Jan. 20: This mine, a long while in the shadow as a good investment, has recently come to the front. The mine is owned by a French company, who have furnished a good many hopeful twenty dollar pieces. With these they also sunk a shaft 800 ft deep in barren rock—in consequence, the property has been discouragingly down at the heel. Recently the superintendent was induced to run to a known chute farther south. This chute of ore was discovered in early times, and, strange to say, was only prospected to the depth of 10 ft. At a depth of 400 ft, on a drift 10 ft wide, they have found no hanging wall—a part near which the vein is said to be the richest. The ore they are now taking out is supposed to mill from \$7 to \$15 per ton—and the cost of mining and milling is about \$3 per ton—leaving a splendid profit for the company. The chute will pay from the grass roots. The miners pan out from 12 to 15 cents from a drill hole 2½ ft deep. Stocks are again up at Quartz mountain.

Nevada.

WASHOE DISTRICT.

UNION CON.—Enterprise, Jan. 20: The joint Sierra Nevada east crosscut on the 2900 level is making good headway. Being now well out from the

station, blasting may be pushed. The rock is the regular Comstock vein porphyry, with streaks of porphyry and clay. All this quartz is metal-bearing. The joint Mexican east crosscut on the 2500 level is passing into ground showing more quartz than was at first seen, but it still has a considerable distance to go to reach the point where it is hoped that ore will be found. The metal-bearing seams of quartz appear to be stringers or feeders from some larger body of quartz.

OPHIR.—The broken spur-wheel was replaced and in operation last Sunday. All the machinery is now in excellent condition. At the joint Mexican winze all is progressing well. A working station is being cut out at the 3100 level. Two sets of timbers have already been placed in position, and in less than two weeks the whole station will be completed. The material encountered in cutting out for the station is the same as was found in the bottom of the winze.

CON. VIRGINIA.—The south drift on the 2700 level is being advanced at the usual speed. The face continues to show quartz giving low assays. All the hoisting of men and rock is now being done at the C. and C. shaft, pending the change of the pumps at the Union shaft. The sending of the men down at this point interferes but very little with the regular work, as no ore is now being hoisted.

CHOLLAR.—The main south drift has crossed the line into Potosi ground and has passed into vein material that gives low assays. The ground is comparatively dry, and is of such character that good headway can be made of it. The seams of metal-bearing quartz appear to be feeders from the main vein, which lies to the west, and when a crosscut shall be run in that direction something of value is liable to be found.

MEXICAN.—A working station is being cut out at the 3100 level. This will be completed in less than two weeks, when an east crosscut will be started. The material found in this large opening is as yet about the same as that passed through by the winze. The joint Union Con. east crosscut on the 2900 level is progressing at the rate of about 20 ft per week, and the material is steadily improving.

SAVAGE.—The joint Hale and Norcross drift on the 2600 level is being advanced at the rate of 40 ft per week. The drift has passed through the belt of soft material which required such close timbering and which was so wet as to somewhat retard operations. The rock is now of a good blasting character and will allow of better progress being made.

SIERRA NEVADA.—The east crosscut on the 2700 level is still following a crosscourse of quartz of good appearance. In a few days this crosscut will reach a point where a change of ground for the better may be looked for. On the 2900 the north drift and the east crosscut joint with the Union Con. are making good headway in favorable ground.

YELLOW JACKET.—Over 60 tons of very fair milling ore now daily being extracted. A considerable amount of prospecting work is in progress, and new deposits of ore are liable to be found almost any day, as occasional bunches of paying ore are encountered in several directions.

HALE AND NORCROSS.—The joint Savage drift on the 2600 level has passed into harder and dryer rock. This allows of better progress being made, as the close timbering is not required which was necessary while in the belt of soft, wet ground. The rock contains seams of quartz that give low assays.

TAYLOR DISTRICT.

MILL.—Eureka Sentinel, Jan. 20: The remains of the old Lemon mill have been bought by the proprietors of the Monitor mine, Taylor District, and will be removed to its destination as soon as the weather permits. These remains consist of three pans and one settler. After this last haul there will be little left of the old landmark but the frame.

TUSCARORA DISTRICT.

ELKO CON.—Times-Review, Jan. 20: During the past week the west crosscut from main drift of shaft No. 1 has been extended a distance of 10 ft. In the main drift good ore has been encountered with every indication of improvement as the drift is advanced.

INDEPENDENCE.—The west crosscut on the 300 level was advanced to ft the past week. The south drift, 400 level, has been extended 17 ft, making a total of 278 ft. No change to note since last report.

GRAND PRIZE AND ARGENTA.—East drift, 700 level, is in 300 ft and west drift 79 ft. North crosscut is in 56 ft. Crosscut towards foot wall in Argenta winze has reached the wall. Hanging wall crosscut is in 16 ft in favorable-looking ledge material; no wall yet. No trouble now with water, and everything is working well.

BELLE ISLE.—During the past week the north drift was advanced 12 ft through ground showing fine seams of ore, and presenting good indications for an ore chimney in the near future. The winze from the 250 level was sunk 25 ft in a favorable formation that shows small seams of ore.

NAVAJO.—The drift on the 450 level was advanced 14 ft the past week. The ledge shows a marked improvement both in size and the quality of the ore vein. On the 350 level, winze No. 2 was sunk 7 ft, and the material found continues to improve in character. Winze No. 4, which was sunk 10 ft, is also looking well. The usual amount and grade of ore is being produced by the stopes. The bullion shipment for the week amounted to \$15,686.18.

WILLOW CREEK DISTRICT.

SILVER WAVE MILL STARTED.—Cor. Silver State, Jan. 16: This day has been a notable one upon this side of the Paradise range. The resounding echo of a steam whistle for the first time saluted the primitive precincts of Queen river. For several years it has been apparent to those conversant with the facts that much merit belonged to the prospects on and about Willow Creek, but it remained for H. H. McColley and T. J. Harlan to render, by the building of a quartz mill, the demonstration of the fact. As to the merits of this camp, I will add that while no excitement prevails, and that there is no wish upon the part of any here to create one, there is already for the first run of this mill about 500 tons of ore from the Iowa mine that samples from \$20 away up into the hundreds. Your correspondent visited this mine yesterday, and found from the face of the tunnel, drifts north and south to the extent of 100 ft on the ledge, showing a 2-ft ledge all the way of good milling rock, say from \$60 to \$70 per ton. Many other properties are showing up finely. The Silver Wave mine, I am informed, is giving good

promise, assaying at the foot of the incline (30 ft) \$17.50 in gold and \$7.80 in silver. Another mine, the name of which I did not learn, is showing up well. It is the property of A. Shrewsbury, and he has several men at work. The claims of John Beran are worthy of mention, and so far as worked have produced a fine quality of ore. The Ohio mine is well known, and needs no mention. While its record is good, allow me to predict that many other properties in its immediate vicinity now in process of development will become as valuable.

Arizona.

STRIKE IN THE EDEN LASS.—Tombstone Republican, Jan. 16: The Eden Lass mine is located south of town about 3½ miles, directly on the center line of the great mineral belt that runs from Tombstone to the San Pedro river, 9 miles distant. It is on the western slope of a low ridge that lies to the west of Ajax hill, and is between a contact of porphyry with the lime. Its course is northeast and southwest, and can be traced for the length of 2 full claims. Two years ago this claim stood very high in the estimation of mining men. Nothing more than the assessment work has been done on it since then until quite recently, when a lease was given to some miners to work it upon tribute. At a depth of 85 ft a drift has been run for some distance in fair milling ore, the ledge being well defined. Coming up within 20 ft of the surface, they discovered a chimney of exceedingly rich ore—ore that is filled with greenhorn silver, with some black metal, assaying from \$1,000 to \$5,000 per ton. They now have out on the dump an amount of ore estimated at \$5,000, net value. They intend to drift to a point underneath this rich chimney, feeling confident that it continues down to that point at least, and how much further they do not know. This strike should have the effect of stimulating others to work their claims in the same locality.

Colorado.

DUMONT AND ITS MINES.—Colorado Miner, Jan. 16: Within a radius of 2 miles of Dumont there are 53 different mines that have produced more or less of the precious metals during the year 1882, and the amount will not fall but very little short of \$50,000. It is mostly gold, but silver has been found in some of the mines in paying quantities, and it is generally believed that the latter will predominate as greater depth is attained. Nearly all the ore that contained silver has been shipped to Georgetown and sold, while the gold ore has been worked up in stamp mills at that place or shipped to smelters in the valley. Among the most prominent mines are the Albro, Eagle, American Eagle, Ohio and Syndicate. Many other mines give good prospects, but the developments are too small to judge of their value. The two stamp mills, the Albro and the Mansfield, have been kept busy most of the past year on free milling ore. Dumont has improved but very little in the last year, although we noticed some new buildings in course of construction. The growth has been steady and healthy ever since the name was changed from Mill City to Dumont, and new buildings are only put up to meet the demands of the mining interest, which is the only industry.

Idaho.

THE SMOKY PLACERS.—Wood River Times, Jan. 17: The placer mining season generally lasts 5 or 6 months every year, or from the 1st of April to the 1st of October. Some years the season is much shorter. The snow is seldom gone before the middle of May, and by the middle of September the water freezes and it becomes impossible to wash gravel. The snow is 2½ ft deep in the Smokeys just now, which is a much lighter fall than is customary by this time of year. An open winter and early spring is expected. All the placer mining ground is now taken up—seven locations altogether. Messrs. Swift & McCarter intend starting up work early in the spring.

LITTLE LOST RIVER.—Wood River Times, Jan. 20: The mines are located on Little Lost river, in this county, 40 miles northeast of Arco, a stage station on the Blackfoot and Wood river road. The surrounding country is covered with lava. There is but one lode, the Tyndall, which runs north and south and dips to the west. The formation is rotten or decomposed quartzite, with trachytic dykes or crosscourses running through on the east wall. A peculiarity of the lode is that a 25-ft reef of pure white sandstone runs along the whole course of it in the vein. Wood and water are abundant.

Montana.

THE CABLE STRIKE.—Inter-Mountain, Jan. 20: The strike recently recorded in the Cable gold mine is one of the most important mining developments announced within the past year. Supt. Savery is averse to the publication of any facts relative to his company's operations, but in the interest of the mining industry of this territory it is deemed expedient to give the public some idea of what is going on in the old camp. Enough ore has been blocked out in the lower workings of the mine from the face of the tunnel to supply the 30-stamp mill for over a year. The ledge is 40 ft wide, well defined, regular and of uniform richness. A little more development will bring into sight an inexhaustible ore supply. The ore now being taken out averages in assay value from \$60 to \$75 per ton, exclusive of the gold nuggets which are frequently found in great profusion and of all sizes. Two weeks ago, it will be remembered, a piece of ore was extracted weighing about 150 lbs, and which was estimated to contain \$6,000 in native gold, most of it in nugget form. At present only 15 of the 30 stamps are in operation owing to the scarcity of water, but these stamps are daily crushing ore valued at \$100 per stamp. As soon as the water supply can be increased the daily product of the mill will be \$3,000, and this yield can be kept up for an indefinite period, as the ore now being treated is only of the average grade. This little 30-stamp-mill is thus making a wonderful record, and the product for this year promises to be over \$1,000,000, if only the ore in sight should be worked. The Cable mine could easily supply a 60-stamp mill. It is considered by all who know anything of its productiveness, richness and extent, a far more valuable gold property than even the famous Drum Lummion. It would take more than a million dollars in cold cash to buy it to-day.

New Mexico.

LAKE VALLEY.—Herald, Jan. 11: Work is progressing steadily at the Hillsboro mine, belonging

to the Black Range Co. The new find in the Superior improves as they work deeper into it, gaining both in extent and quality. In the Bullion the drift has opened into the vein as anticipated, and they are preparing to do considerable stoping. Quite a large body of very rich ore will be taken out as rapidly as possible. The trouble at the Brilliant mine with the employees is all over and a full new gang of men are now at work sinking a shaft, and timbering it thoroughly as they go. This is the mine belonging to Jefferson Reynolds, of Las Vegas. Ten or fifteen thousand dollars' worth of work has been done on the Iron King mine, 1½ miles from Kingston. It has two shafts 8 ft deep and various crosscuts. There are copper carbonates and manganese oxide. The Kentucky mine has 50 tons of fine ore on the dump. In the tunnel there is a 6-ft breast of ore which runs high. There is also a shaft 20 ft deep. On the surface are crop-pings which indicate a very rich mine. The ore is a kind of carbonate. Moore Bros. & McDougal are at work on the Oxford, an extension of the Brilliant, going down on the iron croppings with the intention of crosscutting toward the quartzite. There is an immense vein on the claim, which carries mineral on the surface assaying 42 ozs. Sawpit canyon is showing up some very fair properties, some of them indicating galena which will be valuable for smelting. The Jack-pot, Mountain Maid, Lone Boy, and Yellow Jacket are among those that have been fairly tested by their owners and promise well in future development. Gold in considerable quantities is found on the south branch of the north Percha, in the vicinity of the Solitaire. A pan of dirt showed several colors. This gold placer working, however, will not prove a success in this district, but the fact that the colors are found is important, as it indicates that gold lodes will yet be discovered higher up in the mountains. Work is in progress on the Miner's Dream, which is a very valuable lead. There had been some anxiety on account of the scarcity of lead in the district previous to the recent strikes on this mine, when ore carrying lead in large quantities was discovered. This will avoid the difficulty to some extent, and indicates that there is plenty of lead in camp for fluxing. The "Kentuck," situated in the mining belt in which is embraced the Illinois, Andy Johnson, Brush Heap, United States, Clipper, Good Will and Black-eyed Susan, is developed to the extent of 30 ft in a body of mineral, which is galena, copper carbonates and bromide of silver. The Kentuck only needs to be worked to become valuable to its owners.

A FRAUD.—New Southwest, Jan. 13: In a certain mining district, not a thousand miles away from Deming or Silver City, there is said to be a stock company operating in a very darkish kind of a way. The capital of the corporation is nominally \$400,000. It has ground a distance of about one mile up the side of a steep and rugged mountain. Its agent has sunk two shafts, one 75 and the other 60 ft in depth, sunk in granite—solid granite and in nothing but granite. It has one tunnel in the side of the rugged hill aforesaid for the distance of 75 ft and another 30 ft, out of both of which comes some nice granite. The company employs a superintendent and six men, and instructions were recently received from the East to sink a 600 foot shaft—again we suppose in granite. Parties who have been on the ground say that there is not a trace of metal of any kind in any of the shafts or tunnels, and yet the work of sinking—in granite—goes bravely onward. Work has been commenced on several of the mines at Tres Hermanos, and very favorable reports from them have been received.

Oregon.

SNOW.—Jacksonville Times, Jan. 16: A considerable amount of snow lies back in the hills, upon which the miners anticipate fondly. Wm. Heeley was down from big Applegate this week, who informs us that the Chinese operating the Applegate Gravel Co.'s claims have suspended work. H. D. Russell has sold his interest in the McKee claim on Jackass creek to Polk Dews. W. Q. Brown, superintendent of the nickel mine on Cow creek, is having a wagon road built to G. W. Riddle's old place from the mine. The O. C. and S. mining company, at Oakland, Or., have discharged all the miners, and for the present work in the mine will be discontinued, as they already have ore enough out to run the furnace four months. The last clean-up was 38 bottles of quicksilver. J. F. Salmon, one of the inventors of the quartz mills now being operated at Blackwell and Horsehead, has recently been putting them in running order. They come up to expectations now, and are said to be unexcelled in the economy and perfection of their work. Mr. S. is interested in a hydraulic claim on Cow creek, which has not been worked to any extent this season, owing to the weather. There are two like claims in that vicinity.

Utah.

BARREE & WALKER.—Silver Reef Miner, Jan. 18: Although this property has been encumbered for some time with suits and attachments for debt, we have no hesitancy in saying that at no great distance in the future, affairs now somewhat muddled, will give way to a more favorable impression, and at least no one suffer from loss who has had dealings with this company. At present the property and mill are closed down and undoubtedly will remain so until it changes hands.

STORMONT.—This property is being worked with satisfactory and flattering results under the able and energetic management of Col. Allen. From 10 to 12 teams are engaged in hauling the ore from the mines to the mill on the Virgin river, a distance of some 5 miles, and kept constantly at work. About 35 or 40 tons of good grade ore is crushed daily. The mines are looking better and richer as depth is attained, while development is kept moving in the various shafts, levels and drifts as time and opportunity present. Bullion shipments are regular through McCormick & Co., of Salt Lake.

CHRISTY.—The vast and inexhaustible deposits belonging to this company still improve at each step of development in extent and quality. In a short article for the press one can only get an idea of what the property embraces, or its immense bodies of ore, workings, and so on. To get a proper understanding of these facts necessitates a visit and examination of the underground workings. The Christy Co. has expended thousands and thousands of dollars in opening and developing its mines, which, by the way, has been the boon of success it now enjoys.

Substances Used in Amalgamating.

The application and modification of the amalgamation process, as practiced on the Comstock, has occasioned among experienced millmen great doubt as to the beneficial results derived from the use of any chemical agents at present mixed with the ore. This doubt is occasioned, or at least strengthened, by the custom of late years of decreasing the quantity of salt and sulphate of copper added to the charge, without apparently diminishing the product of bullion. Many amalgamators now abstain from the use of both reagents; others add a small quantity of sulphate of copper, but no salt; in a few instances the custom is to throw in only a little of the latter, while in many mills the rule is to employ a small amount of both substances, owing to a slight prejudice against the abandonment of "chemicals" altogether.

The action exerted by these two reagents in the pan would appear clearly to indicate that the benefits derived from their use are partly to aid in converting the sulphide into chloride of silver, as in the patio, and partly to decompose such minerals as are but slightly attacked by the mercury. In the Comstock process, however, the large quantity of iron present must tend greatly to produce sub-chloride of copper almost as soon as the chemical agents are thrown into the pulp.

Notwithstanding the importance of common salt and sulphate of copper in the patio, and, under certain conditions in the pan, their value must be considered as only secondary in the decomposition of a large proportion of the Comstock ores. The advantages derived from their use are shown to be exerted chiefly upon such minerals as blende and galena, which are but slightly attacked by the mercury. But the amounts employed are in most cases too small to effect any favorable results. On the other hand, if a sufficiently large proportion of the reagents are consumed in the pulp, in order to produce the beneficial returns, it is always at the expense of preserving the necessary purity of the mercury. The quantity of salt deemed necessary by millmen varies from one-quarter of a pound up to seven or eight pounds per ton; scarcely any two establishments have the same rule.

The consumption of sulphate of copper also depends upon the ideas of the amalgamators, but the amounts do not differ so widely as in the case of the salt. It ranges from one-quarter of a pound to three pounds per ton.

The addition of the sulphate without salt is of late years a common practice. The opinion among those who work their ore in this way is that it gives a little better yield than when mercury alone is employed, particularly where the ore indicates the presence of galena in any considerable amount, in which case it is said to "quicken" the mercury and render it more energetic.

Continued experience appears to determine this fact with a considerable degree of certainty. In working ores containing only a small percentage of lead, the quicksilver very soon becomes dull and inactive, or, as it is technically termed, it "sickens," and the yield from the pan is consequently low. Lead is one of the most deleterious metals in destroying the amalgamating energy of mercury, and at the same time is very rapidly absorbed when the two metals are brought into contact. Sulphate of copper possesses to a certain extent the property of expelling lead from the mercury, copper being amalgamated and sulphate of lead formed at the expense of the sulphuric acid of the copper salt.

If a concentrated solution of sulphate of copper be allowed to stand upon the lead-amalgam, the action takes place quite rapidly, mercury containing lead acting much more energetically upon the copper solution than when perfectly pure.

This salt, however, does not appear, under any circumstances, to possess the power of completely driving out the lead.

Another advantage derived from the addition of a small quantity of the sulphate of copper is that mercury, under certain conditions, when exposed to the solution, forms a minute amount of copper amalgam, which causes the metal to act with a somewhat greater intensity in the decomposition of the silver sulphide than when perfectly pure. Iron, as a reducing agent in the pan process, probably plays an important part

in bringing about the favorable results obtained. This may occur, according to Mr. Hagne, in three ways:

First—It aids in a great measure the decomposition of the chloride of silver.

Secondly—It reduces the calomel formed during the operation; the chlorine, combining with the iron, goes into solution, and the heavy metal is liberated. In this way it not only prevents a chemical loss of mercury, but also serves to keep the surface of that metal bright and clean, which otherwise might be coated with a thin film of sub-chloride, which would greatly destroy its activity.

Thirdly—It undoubtedly assists directly in the amalgamation where the two metals are brought into close contact with the easily reducible sulphurets. The successful and continued operations on the Comstock without the aid of any other chemical agents sufficiently prove this statement. The experiments in treating argentite and iron filings with mercury confirm the fact.

Humboldt, in speaking of the amalgamation problem in Mexico, draws attention to this point, and remarks upon the rapidity with which amalgamation was secured when the two metals were triturated together with argentite. This action of iron is obtained not only from the constant agitation maintained, which brings the pulp and metal in contact with the sides and bottom of the pan, but also from the amount of iron disseminated in a fine condition through the ore, produced by the wear of the stamps, shoes and dies.

Plumbago.

Plumbago is an instance in which a variety of uses have been discovered in modern times for an article well known for several generations. Chemically, pure plumbago is a form of carbon, and the chemist knows it as graphite. Popularly it is known as black lead from its metallic lead gray luster. It is still further known as "kish," by workmen, when it occurs among the crystals of rich pig iron. Its specific gravity between 2.09 and 1.8. It feels very unctuous to the touch when rubbed between the fingers. Plumbago neither melts, softens, nor is in any way changed by the temperatures, provided access of oxygen be prevented, and it burns very slowly when heated in atmospheric air. On account of this property, it is a valuable material for making crucibles. As it is not of itself plastic, it is mixed with refractory clay in sufficient proportion to produce a material capable of being molded into crucibles on the potter's wheel. Good plumbago crucibles support sudden alterations of temperature without cracking, and may be used after being repeatedly heated and cooled. The graphite or plumbago on the outer surface will ultimately burn away unless protected by dipping in a mixture of clay and water containing borax in solution.

A few years ago the only uses to which plumbago was applied was in the manufacture of black lead pencils, and for the domestic cleaning of household grates. Afterwards its use as a lubricant for heavy machinery was discovered, and it is now largely used for the bearings of water wheels and other large gear, and as a lubricant for gun carriages, and for blowing cylinders of blast engines. It is peculiarly suitable for blowing cylinders, as it is nonflammable. It is free from the clogging properties of oil, and as dust is frequently drawn into the blowing cylinder, oil soon clogs, rendering constant supervision necessary. Plumbago is also used for lubricating piano keys, the pivots of large clocks, etc., and particularly for wooden cog wheels.

The most famous mine in England is at Borrowdale, in Cumberland; but plumbago is found also in India and Ceylon, in the United States, Canada, Nova Zembla, Australia, in France, Sweden, Russia, and a few other places including Bohemia, where there are large mines. The development of the steel trade has largely increased the demand for plumbago, the large works of Krupp & Co. alone using upwards of 200 tons annually.

Another increasing use of this valuable material is for foundry's blacking, which is used as a facing powder for sand molds by thickly dusting it over the molds, by shaking a bag in which is a quantity of finely powdered black lead. The facing powder is said to need no smoothing after dusting, and does not run before the hot metal. It is used in a similar manner for the molds of chill castings; it is also used to coat the molds of lost castings as a thick paste. It is further useful for coating patterns—if of wood it is rubbed on dry; if the patterns are of iron it is painted or rubbed on with a brush. Another use in the foundry is to throw it on the surface of hot metal whilst in the ladle to prevent too rapid cooling, and for which purpose also a wash is painted on the coating of the ladle, as the plumbago is practically unflammable. There are no sparks, and castings that are from molds, dusted with this mineral, have a fine blue skin.

Of course, plumbago, like other minerals, is never found pure, the impurities being silicon, oxide of iron, alumina, lime, magnesia, etc., according to the localities in which it is found.

To purify it, after being powdered, it is washed and sifted into different degrees of fineness. One of the latest applications of plumbago is in the manufacture of paint. It is peculiarly adapted for withstanding the effects of the weather and salt water, for which reason it has been largely used for painting ships, piers, bridges, tanks, buoys, tarpaulins, railway trucks, etc. Its great body enables it to cover more surface than an equal weight of most paints. At present the only colors which have been manufactured are black and chocolate. It is used for glazing gunpowder, for coating ships and boats to prevent weeds and barnacles adhering to the bottoms, and for dusting steel ingot molds.

Artificial graphite is now made so that the supply is not so dependent upon natural sources as formerly. — *Manchester (Eng.) Mechanical World.*

Bad Mining Management.

Of all the evils that our country is afflicted with, the worst is that of having a quartz mine fall into the hands of Eastern capitalists, or rather Eastern stock gamblers. After a thorough trial of this style of mining, and after watching the results for many years, we are confirmed in the opinion that nothing worse can befall a mine—as far as this country is concerned—than to have it fall into the hands of that class of operators. A good property undeveloped is put into the Stock Board of New York, for instance. The agents to give it a "gilded send-off," convey the idea that it is a perfect wonder and rich beyond compare. They say that all that it needs is just enough capital to start up the mine and mill, and that wonderful dividends will result. Acting on these representations Eastern men put their money into the stock, and in a very short time commence to clamor for the promised dividends. Probably not half enough money has been furnished to develop and improve the mine, and our own people, merchants, farmers and contractors, are holding claims for the half that has not been advanced. And here is where the bad management comes in. Instead of using the proceeds of the mine to pay their debts and make further developments until it is on a substantial footing, the money taken out is shipped to New York and distributed in the shape of dividends with a grand flourish of trumpets, to satisfy the demands of rapacious stockholders and bull the market, and in the meantime our own home people are left to bear the brunt. They must wait, because the property is here, and they are interested in "keeping up the country." Operations are worked along in this way for a while, the mine—which may be a good paying property—is only half worked and does not have half a chance, and then some creditor, who has "packed" it as far as he can, is obliged to bring suit for his money, and the whole business ends in a grand collapse, the mine is condemned, and other valuable properties in the neighborhood suffer because of the failure. The whole system is wrong, and it is a curse to any mining country in the world. When a failure is made in this manner, it is more than an even bet, every time, that a California company of mining men can take the same property, put it in shape, and make it a good dividend paying mine. They know what mining means, and know that it takes time and money to put it on a good footing, except in an exceptional case, now and then, where a perfect bonanza is found, which can be made to pay at once. Mining is a business which needs both brains and experience, and when men with a very small stock of these qualifications are placed in charge, it does not take a wise man nor a prophet to predict that failure is to be the result. — *Plumas National.*

New Method of Separating Minerals.

Mr. T. Buettgenbach contributes to the *Berg und Hüttenmännische Zeitung* the following: The separation of intimately intermixed minerals from each other has hitherto been effected mainly by taking advantage of differences in density, structure or capacity for being rendered magnetic by calcination, while no use has been made of the striking properties evinced in differences of specific cohesive strength. The separation of minerals of unequal hardness, and by reason of their greater or less susceptibility to break down into fragments of different sizes, is not possible with the ordinary crushing or stamping mill; but it is different when the mass is thrown violently against a hard resisting surface, in which case, if the velocity is properly proportioned, only the more brittle substances are broken. In order to obtain a proper separation of iron pyrites and zinc blende, the author has been led to experiment on the use of Vapart's centrifugal breaker, not only as a crusher, but as a separating machine. When this apparatus is driven at 800 revolutions per minute, lumps of iron pyrites of 20 to 25 millimeters diameter are reduced partly to dust and partly to grains of 1 to 1½ millimeter; but when the velocity is reduced to 400 revolutions they are scarcely touched. Blende, which is of inferior hardness, is reduced to the finest fine stuff at 800 revolutions, while at 400 it leaves the apparatus partly as dust and partly as grains of 0.5 to 3.0 millimeters, in diameter. If, therefore, a mixture of the two minerals is treated at the low speed of 400 revolutions per minute, the pyrites are almost entirely unaltered, while the blende, being very finely reduced, may be separated by a simple sifting process. In order to make the process continuous in action, the crushed ore is passed through

a hopper into a drum sieve making nine and two-tenths revolutions to every hundred of the mill, and divided into three parts with holes of 1, 2 and 3 millimeters respectively. The coarser stuff passes into a second drum with two divisions, having holes of 6 and 8 millimeters respectively, which is driven at eight revolutions per 100 of those of the crusher. The size of the sieve holes depends upon those of the particles operated on, and it is important that these shall be as nearly uniform as possible. The operation may be carried on wet or dry, but in the latter case it is essential that the material shall be as free from moisture as possible, as the powder, if damp (with about four per cent. of water), binds, and easily stops up the holes in the sieves. The dust is also a very great inconvenience, which, however, may be remedied by the use of a small jet of water. The separation of the two minerals is not completely effected, as the angles of the grains of pyrites are apt to break off, even at moderate speeds of the machine, and to become mixed with the fine blende; but it is sufficient for ordinary commercial purposes. The economic value is shown by the following calculation: Mixed ores with equal contents of blende and pyrites are worth at the utmost about 10s. per ton, and are not easily disposed of at that price; but when subjected to the treatment described above, the products are 11 cwt. of pyrites, with 5% of blende, worth 9s. 6d., and 9 cwt. of blende, worth 31s. 6d., or a total of 41s. for the separated products. Taking the cost of the raw material at 10s., and the working cost at 9d., the profit on the process appears to be 30s. 3d. per ton of stuff treated. The amount of material that can be crushed in a Vapart mill is about five tons per hour passed once through, so that a single apparatus will be sufficient for even a very productive mine, as mixed ore of this kind never forms more than a comparatively small portion of the total produce. H. B.

Some Reactions of Titanium.

The following "Notes on Some Reactions of Titanium" were submitted at the Colorado meeting of the American Institute of Mining Engineers by Mrs. Ellen H. Richards, of Boston, Mass.: It is of importance to analysts to have a ready means of detecting the presence of small quantities of titanium in iron ores, and in certain fluxes and slags. The method given in Elderhorst's *Blowpipe Analysis* (fusion with potassium hydrogen sulphate) requires considerable practice in order to regulate the heat that the titanium oxide shall become soluble.

In Brush's *Determinative Mineralogy* is found a method which, at least in inexperienced hands, has given better results, i. e., fusion of the substance to be tested with soda on charcoal in the reducing flame. The solution in hydrochloric acid of the bead thus obtained, boiled with tin or zinc, gives the characteristic violet color; but when the mineral contains less than four per cent. of titanium oxide, long boiling and consequent concentration is necessary. In fact the test would seem to be much less delicate than is generally supposed.

In the course of some analyses I quite accidentally found that a peculiar color is given to tumeric paper by solutions of titanium chloride. This color is hard to describe, being modified by the quantity of ferric chloride present in the solution; but it is neither the orange of zirconia nor the red of boron. It is rather a dull shade of purple, and is easily recognized when the paper is dried, although the color fades in a few hours.

By this means a solution containing .015 per cent. of titanium oxide can be easily tested. The same solution, treated with tin, required to be concentrated to one-tenth its bulk before a decided color could be obtained.

The color on tumeric paper is intensified when the solution has been treated with tin and has failed to show a shade of color. This and some other indications show that the best shade of color is given by the titanous chloride rather than by the titanic chloride, and no other salt of titanium has been found to give the color.

Another peculiar property of titanium salts has come under my observation. When titaniferous minerals are soluble in nitric acid, and the solution is subjected to the action of the battery, the soluble titanium is converted into the insoluble oxide and appears on the electrode, in some cases as a white coating; this coating interferes with the estimation of copper, as it is deposited along with the metal, sometimes to the extent of one per cent. of the copper.

In the course of the experiments it was found that a strong battery current reduced the titanic oxide to titanous oxide in aqueous solution, obtained by fusion with potassium hydrogen sulphate in acid solutions of the oxalate and sulphate. The oxalate, in particular, soon became a deep golden yellow, and after 36 hours, although the solution was clear, the addition of ammonia produced a precipitate of a beautiful deep blue color.

THE NEW WIRE GAUGE.—The Board of Trade have issued a circular to those interested in the new standard wire gauge, which is shortly to be legalized, accompanied by a copy of the new standards, and asking the opinion of manufacturers. The Board of Trade does not propose to make any change in the smaller gauges from 20 to 50 BWG, but the sizes of the Nos. 8 to 19 are reduced in the new standard. The wire-makers of Warrington and Shropshire are surprised to find that the Board of Trade has remodeled the gauge on a plan of its own, irrespective of their expressed views.

Tellurium in Copper.

At the Harrisburg meeting of the American Institute of Mining Engineers, T. Eggleston, Ph. D., of New York, read the following paper:

Some months ago samples of black oxide of copper and of pig copper from Colorado were sent to me to examine for arsenic and antimony. I examined them both by the blow pipe, and in the wet way, but found none present.

A quantity of this material was purchased by a large metallurgical works, but when they attempted to refine it they pronounced it to be full of arsenic and antimony; so much so that their furnaces were, as they said, "poisoned," and rendered unfit for refining. I then re-examined the samples, and, at the same time, some of the material which had "poisoned" the furnaces, and found no traces of arsenic or antimony when the usual amounts for analysis were used; but on taking very large amounts I found traces merely, in some parts of the sample, but not in all. As it was a matter of interest to ascertain what the white substance that "poisoned" the furnace was, I sent to the works making the black copper, and obtained some of the matte from which the black copper was made. I took careful samples, both of it and the black copper and the refined copper. I then found the impurity to be tellurium, a substance not heretofore known as occurring in copper. I give below one analysis of the matte, two of the black, and one of the refined copper.

	Matte.	Black Copper.	Refined Copper.
Copper.....	55.02	97.120	98.090
Gold.....	0.06		
Silver.....	0.40	0.132	0.128
Lead.....	17.57	0.777	0.757
Zinc and nickel..	2.22	0.070	0.100
Iron.....	4.18	0.130	0.080
Sulphur.....	20.02	0.236	
Tellurium.....	0.12	0.003	0.007
Arsenic.....		0.006	0.001
Slag, etc.....		1.270	0.102
	99.80	99.834	99.414

*No traces were found with the blow pipe.

The mattes and the black copper are results of the treatment of copper ores with the tellurium ores of Colorado. In the laboratory no traces of white fumes were shown on charcoal, but when the metal in the furnace was subjected to the process of "dry roasting," as was unintentionally done, very dense white fumes were given off. When refined and cast into cake, it had the ordinary appearance of cake copper. It was then reheated for rolling in the ordinary way, showing no signs of impurity. At the first pass in the rolls, very fine cracks showed themselves, which opened in succeeding passes. At a thickness of about 0.03 meter the cracks on either side nearly penetrated the cake, and at about 0.008 meter it began to fall to pieces. It was heated and rolled at different temperatures, but always with the same result.

When cold the metal is tough and malleable. Although the cakes in the molds showed no coating, when they were heated repeatedly and allowed to cool in the air they became covered with a white powder, which proved to be the oxide of tellurium. The copper, as it comes from the cake molds, has every appearance of being good copper.

This is the first time, so far as I know, that the presence of tellurium has been detected in commercial copper. But very little of it is removed in the treatment, as the four analyses show.

It is surprising how very small a quantity renders the copper red short, and consequently worthless for rolling.

The following rates of passage have been adopted over the Southern Pacific Railroad from San Francisco, via El Paso, San Antonio and Houston, to New Orleans: For first-class tickets with stop-over privileges, \$98.50; second-class tickets for a continuous trip, \$80; third-class tickets for a continuous trip, \$55. The following named rates are now in effect for passage by rail from New Orleans, La., to New York City, N. Y.: For first-class tickets, unlimited, according to route, \$53.50 to \$45.35; first-class tickets, limited and for continuous trip, all routes, \$38; second-class tickets, limited and for continuous trip, all routes, \$32.25; third-class tickets, limited and for continuous trip, all routes, \$24.50.

UNDERGROUND TELEPHONE WIRES.—The *Engineering and Mining Journal* says that "there is a good deal of unreasonable agitation in regard to putting telephone wires underground, and the legitimate and feasible plan of subterranean telegraph cables, at least in cities, is assumed, without any knowledge of the facts, to be applicable to telephone wires also. We are assured by practical electricians of high authority that it is impossible to work underground telephone lines under the conditions prevailing in our large cities, and any steps to secure by legislation the removal of the wires from our streets should, so far as they affect telephone lines, be preceded by an inquiry whether or not it is at all possible.

SUICIDE.—Seventy-two persons committed suicide in San Francisco in 1882, from these causes: Intemperance, 22; poverty, 15; temporary insanity, 11; financial embarrassment, incurable disease, physical suffering, six each; domestic trouble and fear of arrest for crime, three each; business disappointment and disappointment in love, two each; jealousy, one.

The Mint at San Francisco is the largest in the world—twice as large as the one in Philadelphia, and three times the size of any in Europe, having \$24,000,000 worth of coin and bullion stored away in its vaults.

USEFUL INFORMATION.

LUMINOUS PAINT.—Balmann, in his luminous paint, succeeded in obtaining a composition that was a great advance on that of Canton and Becynrel. He combined it with a varnish that resisted atmospheric influence, and despite many attempts in the same line, this process has not been surpassed. The great difficulty in making these colors is to have the exact chemical proportions. There must also be an excitant—sunlight, or electric or magnesium light. Water has no effect on it, and the luminous paint produces the same color, no matter what may be the color of the light employed for charging it, only it becomes whiter after a time. Chlorine, muriatic acid and nitric acid destroy the luminous power, and iron and lead substances interrupt it. If this property could be applied to colors it would be of great practical value, but it would depend upon two questions being solved: Whether such preparations would retain this luminousness, and for what length of time; and secondly, whether the luminosity could be preserved when mixed with an adjunct for painting purposes? In this case linseed oil varnish would be necessary for objects exposed to the air, and the preparation would be exposed to the effects of the air like any white oil color, not to mention that the varnish would turn yellow and gradually destroy the luminous force. A firm in Dresden is said to produce a pure white luminous paint. There is, doubtless, a large field for inventors.—*Oil and Paint Review.*

PRINTING ON WOOD.—A machine for printing box sides and ends, instead of stenciling, and doing the work ten times faster than can be done by hand, has been patented by Connell & Dengler, of Rochester, N. Y. It has the advantage of rolling in a very rapid and clear manner all cards or trade marks much more perfectly than can be done by hand, thereby rendering it of great importance to the merchant or manufacturer. The type or form is cast in brass, and secured in such a manner that it can be easily and rapidly adjusted to print upon the board at the proper time. The inking rollers can be instantly raised from the type to prevent inking when the machine is not fed with boards. It will print boards varying from $\frac{1}{8}$ to $1\frac{1}{2}$ inches in thickness, and at the rate of 1,500 to 2,000 impressions per hour. The boards or sides of boxes are introduced to the machine in quantities of ten to twenty pieces at a time, and the bottom piece of the pile is fed by a reciprocating bar to its proper place in order to receive the impression at the proper time, the boards above dropping down to be fed in like manner until all are printed.

AMERICAN AND ENGLISH HOUSE-BUILDING.—The editor of the *Builder and Woodworker* says: The modern London house is a surprise to Americans. If one take the pains to go through 500 or 600 South Kensington houses, all built within the last two years, vacant, and kept in stock for future buyers, he will not take kindly to the way in which English mechanics do their work. Floors are badly laid; strange to say, there is a general shrinkage in the wood-work, indicating the use of unseasoned lumber, and the hardware is of a quality that is never used in this country, except in houses of a very cheap class. The English builder seems to think that almost any kind of hardware will answer, so he uses locks that in six months or a year are a source of constant vexation. To make matters worse, the work of adjusting hardware to its place is badly done; doubtless the result of piece-work at low prices. These remarks apply to houses that are held at a valuation of \$100,000, and on leased ground, and the writer does not speak from hearsay, but from observation.

TEMPERING LOCOMOTIVE SPRINGS.—In regard to the correct method of tempering locomotive springs, a contemporary says: I will give a recipe, and one that has been tested and is now in use in a number of railroad shops. The materials to be used are as follows: Eight ounces gum Arabic, four ounces oxalic acid, two pounds fine salt, two and one-half pounds brown sugar and 15 galls. whale oil. Heat the leaves of the spring red hot, but not so as to burn or overheat. Plunge into the mixture and let lay until cool. In using the above mixture it will have to be employed in an iron tank. The best method for testing a spring is to put it under a locomotive and let it be used practically. If it is not tempered properly it will soon show evidence of it.

SAWDUST INSTEAD OF HAIR.—It is said that sawdust is better than hair in protecting rough cast from peeling and scaling under the influence of frost and weather. The sawdust should be first dried and then thoroughly sifted, in order to remove the coarser particles. A mixture is then made of two parts of sawdust, five parts sharp sand and one part cement, which should be thoroughly stirred together and then incorporated with two parts of lime.

TO PRESERVE HICKORY TIMBER.—The *Hub* says that a thorough dosing of hickory timber with raw turpentine is a preventive of the ravages of worms, and one of its correspondents says that this will destroy worms already at work in the timber. Carriage makers whose valuable stocks of hickory are being injured by pests will find this worth a trial, at any rate.

EDGE TOOLS.—There are many times when it is very desirable to have the edge of a tool preserved, as in the case of boring a cylinder, milling-cutters, gear-cutters and similar standard tools, but I think it may be safely said that there are not half enough grindstones worn out in any machine shop. Then an oilstone is a good thing. Many suppose an oilstone is only intended for carpenters and pattern-makers, but I find a turning tool will hold an edge much longer if nicely whetted, and besides, will do a better job. Every lathe should have an oilstone.

The longest line of fence in the world will be the wire fence extending from the Indian Territory west across the Texas Pan-Handle, and 35 miles into New Mexico. We are informed that 85 miles of this fence is already under contract. Its course will be in the line of the Canadian river, and its purpose is to stop the drift of the Northern cattle. It is a bold and splendid enterprise, and will pay a large percentage on the investment. The fence will be over 200 miles long.

BRICKMAKING WITHOUT BAKING.—Equal parts of hydraulic lime, sand and scoria are pounded and then mixed, being made into a paste by the addition of water. This paste is submitted to strong pressure in molds, and afterward hardened in cold water. The bricks, therefore, it will be seen, consist of hydraulic cement.

GOOD HEALTH.

A Marvel of Surgery.

The Philadelphia *Record* relates the following remarkable case of surgery, in which a man has been breathing for five years through an opening in his throat. We quote as follows: The students in the Hospital of Oral Surgery, at Tenth and Arch streets, were shown a patient at Saturday's clinic whose throat had been cut from ear to ear, and who had then been hanged by the neck, but still survived his injuries. He breathes through a silver tube in the throat, and for six months was nourished entirely by enema.

The man's name is Simon Ladenski, a native of Roumania. In the winter of 1877—he then being 23 years old—Ladenski was one of a party of 10 men whose throats were cut by a band of gypsy robbers on the road from Varsloe. Ladenski was not killed, and on regaining consciousness and finding the robbers quarreling over the division of the plunder, he attempted to crawl into some bushes by the wayside. Being detected, he was strung up to a tree by the neck, and when again unconscious he was let down and thrown among the bodies of his companions, but not until he had been stabbed in the abdomen and cut in the cheek. Two days later the bodies were found by Prof. Russ, of Jassy, and Ladenski and a companion who was still alive were removed to town. The latter soon died, and then Prof. Russ removed his patient to Vienna. There Ladenski was placed under the care of the most eminent Austrian surgeons. It was found that the windpipe was closed, and for two years the man was unable to utter a word. He breathed through an opening in the neck. After many efforts a large threaded needle was passed up through the trachea and into the mouth. Small beads were then drawn through, being daily increased in size in order to effect a permanent enlargement of the obstruction. The man is still obliged to practice this device, and wears the instrument in his windpipe during the night, being able to breathe when in an upright position without aid. He has been examined by the leading surgeons of Berlin, Paris and London, and it is expected that some day it will be possible to close up the opening in the throat.

Face Ache.

Half the human race perishes before its time for the want of a little knowledge of the rules that govern health. The beginnings, the nuclei, are few, from which radiates the hosts of diseases that afflict mankind. It is important, therefore, that everyone should know what mischief may come from neglect of things seemingly trivial. As an example, let us trace the possibilities connected with that very painful, but very common ailment, toothache. The intense pain is caused either from an inflamed condition of the membrane that lines the tooth socket, the tooth being sound, or else from decay in the tooth itself, which has extended to the nerve. In either case we have inflammation of the membranes and nerves that are encased in unyielding channels of bone; hence the severe pain, followed by death and decay of the parts affected. While it would, as a rule, be unwise to resort to radical means to cure the trouble during the inflammatory stage, it is positively unsafe to neglect those means when the pain and irritation have subsided, for the *truce* is usually but temporary. If the decay extends to the surface of the tooth, the cavity forms a sort of safety valve for the escape of the dead matter, thus postponing or preventing more serious symptoms. But if the teeth are apparently sound, and there is neuralgia of the face, head, neck or shoulders, it is certain that the teeth are not sound, and that an expert dentist will find minute cavities extending from the crowns to the fangs of some of the teeth, or else ulcerative points at the extremities of the fangs themselves. The remedy, of course, is to properly fill every cavity, being careful to make a

minute examination, so as to miss none. In all recent cases this is a radical cure. Should that course fail, it is certain the disease has extended beyond the reach of that remedy, and however sound appears the offending tooth, it must be removed, and the removal of teeth must continue until they are all gone, if found necessary to check the neuralgia. There are, unfortunately, neglected cases where these methods are unavailing, and where the surgeon follows the disease to the cavities of the jaws, sawing through the bone and taking out the dead portion of the nerve; and still there are depths beyond the reach of human skill, where the sufferer writhes in pain until death comes to his relief; for a diseased tooth may be the beginning of fatal nervous diseases, and of dyspepsia and blood poisoning. We trust this article will be carefully read, for it points out the cause and the remedy for a class of diseases that produce more intense suffering in the world than all other diseases combined.—*Journal of Health.*

Long Life.

The subject of longevity is always one of great interest to everybody. "Live forever" is a favorite salutation in some countries. In the old times people found great delight in imagining their heroes gifted with continual life and un fading bloom of youth. With what breathless interest one follows Ponce de Leon as he plunges into the wild forests of Florida in the fruitless search for the fabled fountain. With the advance of civilization and the scientific study of disease and medicine and the better understanding of sanitary conditions and laws, there has been a steady increase in the average life of the individual. Governments are studying how best to promote length of life. Those who lead sober, peaceful lives, free from all great troubles and strong excitements, are surest of the coveted length of days.

Some time ago the French Government sent a circular letter to all the districts of that country to collect information as to those conditions of life which seemed to favor longevity. The replies were very interesting, but on the whole rather monotonous; the general result was that longevity is promoted by great sobriety, regular labor, especially in the open air, absence of excessive fatigue, easy hours, freedom from galling poverty, a philosophical mind in meeting troubles, not too much intellect, and a domestic life. The value of marriage was universally admitted, and long-lived parents were also found an important factor. A healthy climate and good water were mentioned. All this agrees with common sense, unless the idea that the intellect is a hindrance to longevity be considered unreasonable, and we know that some of the most intellectual men have lived to a great age.

Interesting researches concerning the comparative longevity of men and women in Europe have recently been made by the Director of the Bureau of Statistics at Vienna. From these it appears that about a third more women than men reach advanced age. This seems corroborative of what was said above. Women offend rather than men lead quiet, regular lives. They have fewer bad habits; are less exposed to strong passions and excitement.—*Potter's Monthly.*

Value of Asses' Milk for Children.

In the Paris Academy of Medicine, M. Parrot has recently called attention to some remarkable results obtained in the Hospital des Enfants-Assistés of Paris in feeding delicate infants with asses' milk. Many of the infants in that hospital have diseases which forbid their being suckled by nurses (whom they would soon infect). Hence, the feeding bottle was formerly used for them; but, spite of great care, the endeavor to foster the small vital force of these children was of little avail. Direct application to the udder of an animal was then tried. At first the infants were thus fed with goats' milk, but it was soon found that asses' milk was greatly preferable, and all are now fed with that, one, two, sometimes three infants being held to the animal's udder at once. The nurses do this with great ease. During six months eighty-six infants having congenital and contagious diseases have been treated in the hospital nursery. Of the first six, fed with cows' milk on feeding bottles, only one was cured. Of forty-two fed at the goat's udder eight were cured, while thirty-four died. Of thirty-eight fed at the asses' udder, twenty-eight have been cured, while six have died.

The virtues of asses' milk have been appreciated some time in France. For many years Paris and the large towns have been visited every morning with troops of the asses, brought in to supply their milk for invalids. It is said the use of the milk was introduced by Francis I., who, reduced to a very weak state and a despair to physicians, was induced by a Jew from Constantinople to take asses' milk, and thereby got well again. This milk has much less of plastic matters and butter than goats' or cows' milk, and is easily digested. M. Parrot notices the practical advantage in the ease of suckling from the ass, in that the animal is so easily fed; it is content with the poorest fodder. The goat suffers from a diet that lacks variety, and in the city its milk is not what it is in the country. The asses kept at the hospital referred to are in stables adjoining a field, in which they generally pass part of the day. It may be mentioned, in fine, that weekly statistics for Paris have lately presented the unwonted fact of an excess of 200 and 240 births over the deaths.—*London Times.*

MINING SCIENTIFIC PRESS.

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SAN FRANCISCO:
Saturday Morning, Jan. 27, 1883.

TABLE OF CONTENTS.

EDITORIALS.—Locke's Improved Lead Smelting
Furnace; Our New Dress; The Tehichepa Disaster, 49
Passing Events; Manufacture of Engines; Driver's Pat-
ent Mortising Machine, 56. Centering the Transit in
Mining Shafts, 57. Mines and Mining in 1882, 57-62.
Patents and Inventions; Notices of Recent Patents, 68.
ILLUSTRATIONS.—The Locke Patent Lead Smelting
Furnace, 49. Beckett's Improved Horizontal
Engine; Driver's Improved Mortising Machine, 56.
Improved Apparatus to Center the Transit by Screws
in Shaft, 57.
CORRESPONDENCE.—The Black Sand Question;
Notes from Eureka, Nevada, 50.
MECHANICAL PROGRESS.—Judging by the
Fracture: Iron Rust as a Cement; Shop Practice, 51.
SCIENTIFIC PROGRESS.—Practical Application
of the Lenscope; Bisulphide Carbon Lenses; Gum
Arabic in Certain Chemical Reactions; Poteline; Cheap-
ened Aluminum; A Curious Phenomenon; Soap Manu-
facture, 51.
MINING STOCK MARKET.—Sales at the San
Francisco Stock Board; Notices of Assemblages, Meet-
ings and Dividends, 52.
MINING SUMMARY.—From the various counties
of California, Nevada, Arizona, Colorado, Idaho, Mon-
tana, New Mexico, Oregon and Utah, 52-3.
USEFUL INFORMATION.—Luminous Paint;
Printing on Wood; American and English House-Build-
ing; Tempering Locomotive Springs; Sawdust Instead
of Hair; To Preserve Hickory Timber; Edge Tools;
Briekmaking without Baking, 55.
GOOD HEALTH.—A Marvel of Surgery; Face Ache;
Long Life; Value of Asses' Milk for Children, 55.
MISCELLANEOUS.—Wooden Water Pipe; Mining
Laws, 50. Substances Used in Amalgamating; Plum-
bago; Bad Mining Management; New Method of Separat-
ing Minerals; Some Reactions of Titanium, 54.
Tellurium in Copper, 55.
NEWS IN BRIEF—On page 65 and other pages.

Business Announcements.

Woodworking Machinery—Parke & Lacy, S. F.
Machinery—Thomas F. Rowland, Brooklyn, N. Y.
Ahe! Stearns Ranches—A. Robinson, S. F.
Turbine Pumps—San Francisco Tool Company.
Engines and Boilers—W. H. Ohmen, S. F.
Inventors' Institute of California—San Francisco.
Dividend Notice—Bulwer Con. M. Co., S. F.
Stock Dividend—Olla Silver Mining Company.

Passing Events.

During the past week we have had a suc-
cession of accidents, attendant with loss of life,
phenomenal as occurring in so short a space of
time. The dreadful accident on the Southern
Pacific railroad, where the train went rushing
down the grade, carrying with it to death a num-
ber of helpless passengers, was the first of these.
Then we read of the wreck of the *Cimbria* and
some 450 passengers drowned. Then came the
Giant Powder explosion at the works across the
bay, when a number of Chinese and one white
men were killed. All these accidents occurring
so soon after the fatal hotel fire in Milwaukee
have made nervous people apprehensive.

We publish this week a very complete and
full review of the mining interests in 1882,
giving figures of yield from the different sections,
and statistics and dates of value for future re-
ference.

Attention is also called to our new dress of
reading type, which much improves the appear-
ance of the PRESS.

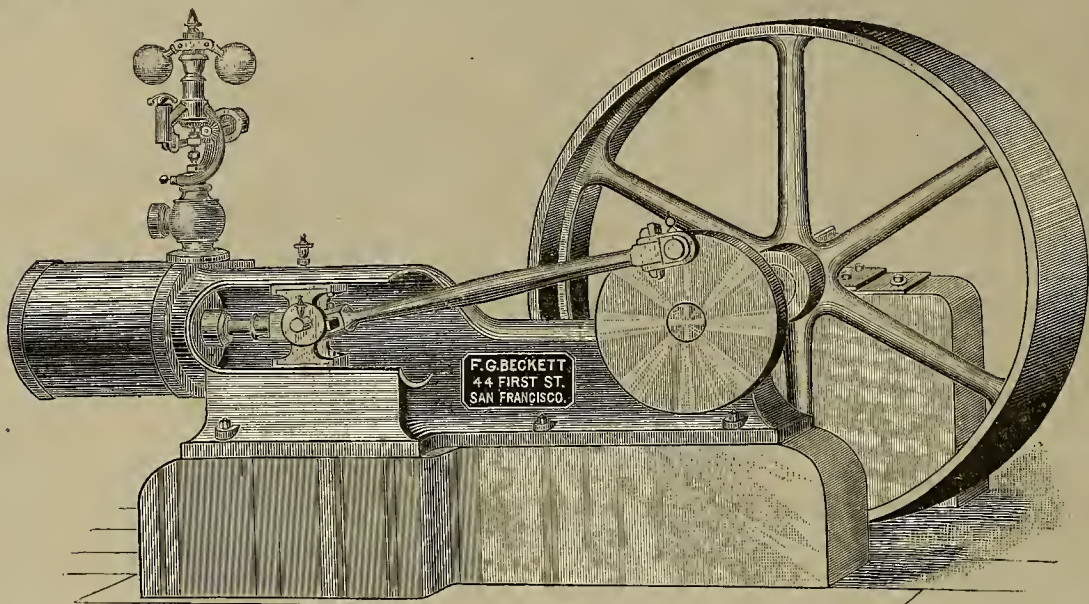
A STORE at Gold Mountain, Nev., was robbed
on Thursday or Friday last by mounted and
masked men. The proprietor and two clerks
were killed. The road agents then proceeded
on their way to the store at Silver Peak, which
was also robbed by them, the proprietor and
one clerk being killed. Two of the robbers
were also killed.

Manufacture of Engines.

A new establishment for the manufacture of
vertical and horizontal engines and boilers has
been recently opened in this city at 44 First
street, of which F. G. Beckett is the proprietor.
Mr. Beckett has made the manufacture of steam
engines and boilers a specialty for many years, dur-
ing that time building upwards of 1,000. Mr.
Beckett has been on this coast some six or seven
years, but before that he had extensive works
at Hamilton, Ontario, where they built on an
average an engine a day. Thinking there was a

the bearings are made of extra length. The
valve rods work in substantial guides. The
balance wheels are of ample size and weight,
and are turned true for driving belt. The boil-
ers and engines are all tested and set to work
before leaving the works. Vertical engines alone
from 2 to 50 horse-power are made, and vertical
engines and boilers combined from two to 24
horse-power.

Mr. Beckett also makes a specialty of horizon-
tal engines of the type illustrated by the accom-
panying engraving. The engines are built in a
substantial manner on a massive solid box frame.



BECKETT'S IMPROVED HORIZONTAL ENGINE.

more extended field in this State than in Canada,
he came to this coast. He first spent a year or
two in the mines to obtain a knowledge of the
requirements of mining machinery, and has since
been employed in the large foundries in this
city.

He has just started the manufacture of hori-
zontal and vertical engines and boilers, claiming
for them beauty of design, neatness of work-

The cranks are turned and balanced. The
piston and valve rods, crosshead and crank
pins are made of the best machinery steel. The
crosshead is fitted with brass gibs, with a very
large area of wearing surface. The valve is a
plain slide valve having extra large wearing
surface at the bottom end, the valve rod being
carried in a substantial guide. The balance
wheels are turned and bored perfectly true,

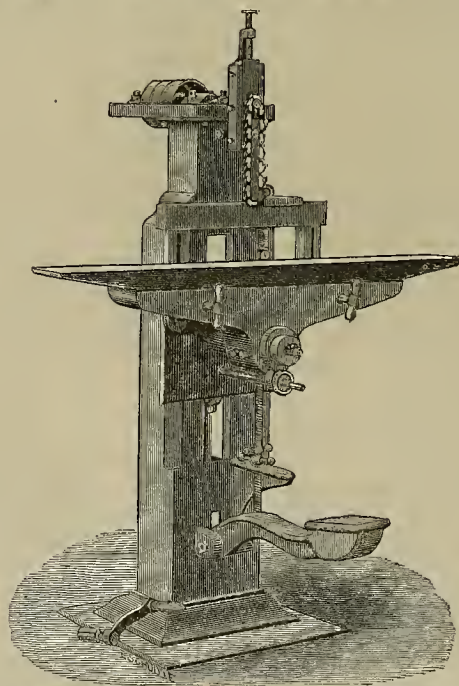
the clutch is thrown in and the chain set in mo-
tion. At the same time the table where the
material to be mortised is placed is raised to
the cutter or chain so that the chain is only in
motion while doing the work.

There is also a chip breaker that holds the
stuff firm while it is being mortised and re-
leases it when the treadle is up. The chains
are kept tight with a screw and spring at the
top, and by loosening the screw the chain may
be easily taken off. The machine is provided
with all the standard sizes of cutters. The
table is so arranged that it may be set in any
desired position. The machine makes a clean
mortise, as it takes out the cores at the same
time, and the inventor claims that it will do at
least twice as much work as any other machine.
He states also that it will not split the most
delicate or cross-grained wood, and will go
through knots without breaking them out or
injuring the cutters.

This machine is specially adapted for mortis-
ing redwood doors such as are being made in
large quantities for South America and Mexico.
With the hub attachment it is excellent for
wagon work, as it will mortise hard wood with-
out boring.

The machine is of such capacity that it will
make a mortise as small as a quarter inch by a
half inch. Any length of mortise can be made
by moving the work and making several cuts.

The machine is made in a neat and substantial
manner, every part being fitted in the best way
and nothing but the best material used. The
cutter goes through the material with one cut,
so there is no need of turning it over. John
Driver, of San Leandro, is the inventor and man-
ufacturer of this mortising machine.



DRIVER'S IMPROVED MORTISING MACHINE.

manship, cheapness, durability and economy in
working. The vertical engines and boilers are
connected together on a substantial iron base
occupying little space, and may be easily
mounted upon wheels, rendering them well
adapted for agricultural purposes, or they can
be placed with perfect safety on a hoarded floor,
the insurance companies making no extra charge
for their use. They are very simple in their
construction, and can be run with safety by
persons of ordinary intelligence. The combined
engines and boilers (except the two and three
horse-powers), are all supplied with heaters.
The working parts, such as the piston rod, valve
rod, crosshead pin, etc., are made of steel, and

ready for the driving belt, and are of ample
weight for all purposes. The outboard bearing
is supplied with a separate sole plate, and the
engines are complete with governor ready to
connect to the boiler. Duplicates of all work-
ing parts kept on hand. This style of engine
is made from 10 to 90 horse-power. In addi-
tion to these specialties, Mr. Beckett is prepared
to manufacture engines for steam yachts and
launches, hoisting engines, donkey engines,
pumping and irrigating engines, etc.

The Western Union Telegraph Co., after long
consideration, has taken an important step in
the direction of putting all its wires in New
York under ground.

POWDER EXPLOSION.—An explosion occurred
at the Giant Powder Works, Fleming's Point,
Alameda county, on Sunday, by which 25 Chi-
namen and one white man met their death.
The cause of the explosion is not known, as all who
were in the house when the first one occurred
were killed. There were seven distinct explo-
sions, with a short time clapsing between each,
the explosions occurring in different isolated
buildings. The circumstances overthrow some
of the preconceived notions about this powder,
the separate explosions being contrary to gen-
eral theory. The large magazine, in which were
many tons of powder, remained intact.

MRS. THEODORE TILTON recently sought and
found employment as a nurse in a Brooklyn
sick room.

Centering the Transit in Mining Shafts.

The engravings on this page illustrate an improved apparatus for centering the transit in mining shafts by means of screws. The principle of the apparatus was described in the MINING AND SCIENTIFIC PRESS a few years ago; but the details have since been improved on by the inventor, Ernest Koch, of Sutro, Nevada.

By set screws *l* and *e*, and the iron bar *a*, the apparatus is well tightened against the roof and bottom of the drift, similar to the method adopted in machine drilling. The arm *g* will slide up and down on the bar *a*, and is well secured on the bar *a* by a ring *d* and a screw *c*.

The box *i*, on which the transit is screwed, slides on the arm *g*, being moved by a screw *n*, a sliding staff *k* guiding and steadying it. The transit can be turned around the bar *a* by the screw, and can be centered by means of the screws *m* and *u* under the plumb.

The light *q* may be slid up and down and turned on the bar *a*, a ring and screw *p*. Fig. 1 is a side view; fig. 2 a top view; fig. 3 is the apparatus as originally constructed.

The improvements in this apparatus are to facilitate the putting up of the transit as in timber or in rock, and particularly in inclines and shafts so it will be steady.

The apparatus is very useful in badly ventilated and hot mines. Before the connection of the Sutro Tunnel with the Comstock mines, when the tunnel was in over 1,000 ft., there was very hot and bad air, and Mr. Koch and his assistant fainted several times in surveying the tunnel line at the time Mr. Koch perfected the apparatus for centering the transit.

The correctness of the apparatus was perfect, and the inventor writes us when the tunnel connection was made and the air was pumped, the daylight of the tunnel entrance was seen a distance of 20,000 ft.

Mr. Koch has used his apparatus with success to survey with the leveling instrument during the excavation of the sub-drain to carry the hot water of the Comstock mines through the tunnel. A thousand miners were at work completing the sub-drain for the 2,000-ft. during 90 days, and Mr. Koch was compelled to survey the grade and not interfere with the working men. By the use of the apparatus it is very easy to change the height of the leveling instrument.

CONTINUITY OF DIVIDENDS.—Continuity of dividends for any lengthened period is not a characteristic of American mines. Dividend mines are not plentiful. The few that come under that head are oftener managed more with a view of making money out of the variation in the value of the stock, rather than out of the dividends. Hence the mine is worked to make big dividends for short periods, instead of small dividends for long periods. This is done by selecting ore of high grade for the mills, leaving the low grade to be worked to depress the stock and get it back. An honest management will not let a good body of ore become exhausted before prospecting for another, but will judiciously use the resources of the mine in its period of prosperity.

ASSESSMENT WORK AND PATENTS.—The Commissioner of the General Land Office says: L. J. Webster, San Francisco, Cal., Sir: I am in receipt of your letter of September 6, 1882, asking whether, after purchase money paid and Receiver's receipt issued, it will be necessary to continue annual expenditures until issuance of patent. In reply you are advised that no annual assessment work need be done after final entry is made.

SULPHUR MINES.—Superintendent Rhodes is actively working the Humboldt sulphur mine, Nev. They have a deposit of pure brimstone. All they have to do is to blast it out. Each blast sets the brimstone on fire, but they are

WARD.—The gratifying news comes from Ward that the outlook of that camp is very flattering. The Martin White mill started up about the 10th inst. There are 60 men employed in the mine and about 30 in the mill. Nearly

Mines and Mining in 1882.

A Review of the Work of the Year.

Since the year 1877, when the great Comstock bonanzas were yielding their millions, we have not had so productive a year from the mines of the United States as that of 1882. The total yield last year was \$92,411,835, which, compared with 1881, when it was \$84,504,417, shows a gain of nearly \$8,000,000. It must be remembered, also, that 1881 was the best year in 10 or 12, except the memorable years 1876 and 1877, when we were producing in the nineties. The main increase this year comes from Colorado, Idaho, Montana, Utah and New Mexico, in all of which regions many new mines have been opened.

Until a few years ago California and Nevada overshadowed all the other mining regions of the United States. Then, when the Comstock bonanzas were exhausted in Nevada and the Leadville discoveries in Colorado were developed, the latter State took the lead, California still being second and Nevada third.

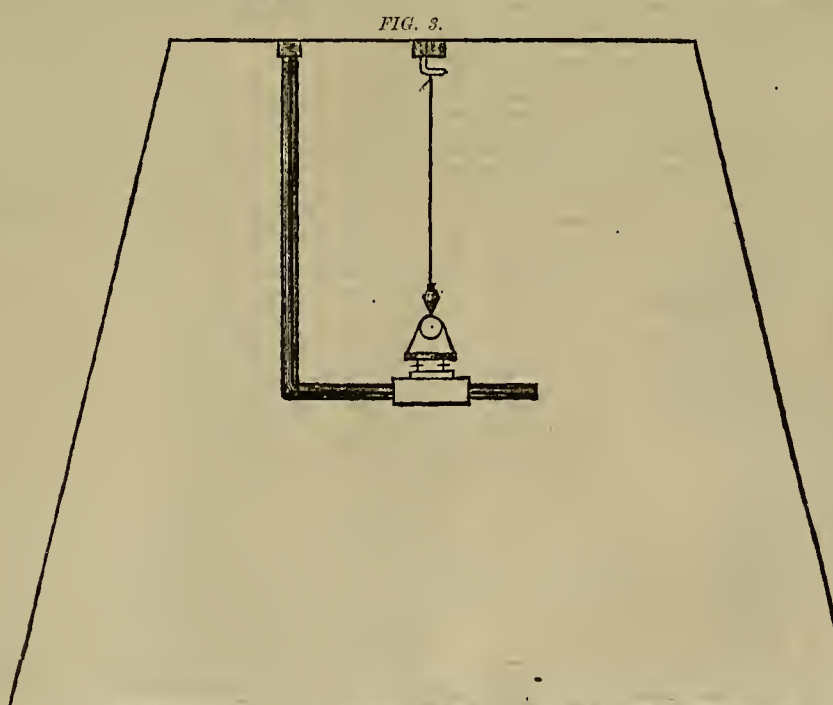
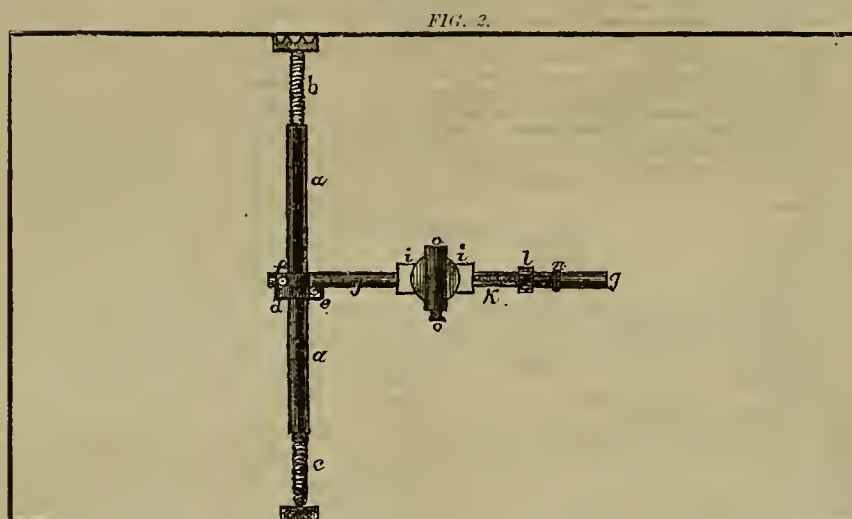
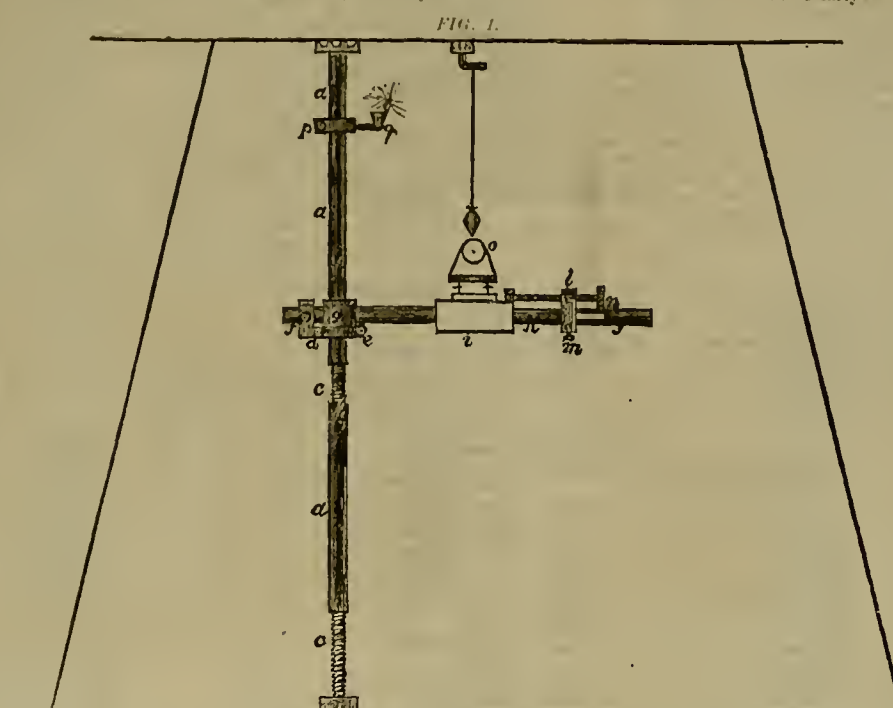
One thing should be recollected in this connection that is often forgotten: What may be a big development in a new region might not be considered so in an old one. When a lot of men are prospecting a claim and good ore is struck in a new camp, the fact is heralded abroad as one of great importance, and considerable attention is paid to it as auguring success for the camp in the future. The inference is that most of the other mines near by are just as good. But when the end of the year comes and the results are figured up, perhaps some quiet old camp has far exceeded the yield of the new and "boomed" one.

For instance, a good many people imagine that California and Nevada are played out for mining, and that the mining industry is dead in both States. Yet at the end of every year these "played out" regions show a net product ahead of all the other States and Territories except one. They have remained second and third for some few years. The other Territories and States, much advertised and "boomed," with new mines, mills, reduction works, towns, railroads and all sorts of things, make a great deal more noise about what they are doing than do the old settled regions. California, for instance, this year yielded six millions more than any other State or Territory except Nevada and Colorado. She beat Nevada 1,000,000 and Arizona 7,000,000, and all the others run below her. And this in the face of a depression of her grand mining interests resulting from litigation, which other regions are free from.

Very little capital is coming to this State or Nevada, but a good deal is going elsewhere. The other regions will no doubt progress rapidly, and it is hoped they will. But then people should remember that there are other places which are at work at mines, and doing good work too, as results show.

A much broader region of mining ground has been prospected this year than ever before. Men have ranged over the mountains in every direction, starting new camps here and there and everywhere. Railroads are being extended in all directions, and the mining interests of the country being rapidly developed.

In New Mexico, Idaho, Montana and Arizona considerable prospecting is going on. Colorado, Nevada, California and Utah are now at work developing their old ones. Taken all together the work has been very satisfactory everywhere. More people are now interested in mining pursuits than ever before, and people are commencing to see that miners are not a set of stock gamblers. In fact, the operations at



IMPROVED APPARATUS TO CENTER THE TRANSIT BY SCREWS IN SHAFT.

prepared for this, and after a shot is fired they at once advance and throw water upon the burning mineral.

The Quicksilver mines at Steamboat Springs, Nev., sometimes called the Humbert mine, has been sold for \$2,013 to satisfy a judgment.

everybody has something to do, idle men being very scarce. The mill reduces from 50 to 55 tons per day. It has 20 stamps, and the ore is roasted. The ore goes on an average from \$120 to \$150 per ton.

The thermometer at Butte, Montana, recorded 61° below zero on Saturday.

The following tables show the percentage of gold and silver in the years named:

PERCENTAGE OF GOLD AND SILVER IN 1882		
	Gold	Silver
Standard Con.	87.8	10.2
Bodie Con.	84.8	45.2
No. 100	80	44
North No. 100	84	44
Sybilicate	81.4	8.6
Bodie Tunnel	83.4	6.6
Tailings mill	80	33
Bodie Con.	86	14
Scattering	85	5

PERCENTAGE OF GOLD AND SILVER IN 1881		
	Gold	Silver
Standard Con.	91.4	8.6
Bodie Con.	88.6	31.25
Sybilicate	89	11
No. 100	84.02	5.93
North No. 100	87.75	42.25
(unofficial)	8.50	91.50
Scattering	88.50	1.50

PERCENTAGE OF GOLD AND SILVER IN 1883		
	Gold	Silver
Standard Con.	91.4	8.6
No. 100	84.02	21.43
North No. 100	87.75	50.41
Bodie Con.	88.50	41.50
Bodie Tunnel	83	6
Bodie Con.	87	37
Sybilicate	89	11
Bodie	85	70
Scattering (banks)	85	5

PERCENTAGE OF GOLD AND SILVER IN 1879		
	Gold	Silver
Standard Con.	92	8
Bodie Con.	85	15
Bodie Tunnel	82	32
No. 100	80	30
Sybilicate	80	10
Scattering	83	7

There is this to be remembered concerning the mines of California. The State is the oldest of what are known as the "mining States." The region has been longer settled. There are roads nearly everywhere, and many small towns, settlements and camps in every nook and corner of the mining region. Moreover, we are not confined strictly to mining, but may farm and mine too, or do both on the same land. The miners are not compelled to live in an unsettled, half-civilized region, but can live as much should in these days. Property rights are pretty well settled, titles are well founded and mines easy of access from commercial and manufacturing centers. Supplies are easily procured, the best of machinery readily procurable, and in most places the mines can be worked all the year round.

In addition to the quartz mines mentioned, nearly every interior county in the State has its quartz properties. Amador, Butte, Calaveras, Placer, El Dorado, Inyo, San Bernardino and others boast of their good mines, all of which we have more or less frequently mentioned during the year. The dividends for the year foot up \$1,449,900 against \$1,820,000 in 1881. This is only from incorporated companies. During the year 68 mines in 14 counties have leveled 121 assessments, aggregating \$1,547,467, as against \$2,237,550. A good many of the gravel claims have been embarrassed by litigation.

We have spoken at some length of the Bodie mines, Mono Co., and stated that the Nevada county mines, with those of that county, were the principal ones in the State. The following about Nevada county, from the *Foothill Tidings*, is to the point: No equal area in the world has produced more gold than has Nevada county, and no region known has the promise of an equal mining permanency. The gold is found in both quartz ledges and gravel beds. Nevada and Grass Valley townships are the principal portions in which quartz mining is carried on. Eureka and Washington townships, further east and higher of altitude than the two first named, have also many valuable quartz ledges. The mines in Grass Valley and Nevada townships have been systematically worked and developed for many years; those of Washington and Eureka have received but little of the proper kind of attention. The Meadow Lake mines are idle now. Rough and Ready township has many gold-bearing quartz ledges in its eastern portion, while in its west part are valuable deposits of copper. The great gold gravel region of the county is in the townships of Bridgeport, Bloomfield, Eureka, Little York and Washington. These are of immense extent, and of incalculable richness. These beds are worked by the hydraulic process for the most part, and enormous values of gold are annually washed out of them. There are some gravel mines in Nevada, Grass Valley and Rough and Ready townships, but they are not extensive—excepting at Moony Flat and Rough and Ready, where is the extension of the famous gravel leads of Tumbucto, Smartsville and Sucker Flat. The most famous of the present active quartz mines are the Idaho, New York Hill and Empire. These are dividend payers at the time of this writing. One of them, the Idaho, paid on the first Monday in December, 1882, its 162d dividend. The mine has produced over \$6,000,000, and has kept in constant employment and at three-dollars-a-day wages a large number of men. The Empire is the oldest of all the mines now working in this State, and it, as well as the Idaho, gives promise of indefinite continuance. The Allison ranch, North Star and some others that were celebrated as gold producers in times past will soon be worked again. Cheap water power for machinery will cause those mines to resume. A revival, or rather renewed impetus to mining is certain in the year 1883 in the rich regions round about Grass Valley and Nevada City.

All the other States and Territories are credited with their production of copper and lead, but California is not. She produces no lead, but does produce some copper. She produces, however, what no other region in the United States does, and that is, quicksilver. This year the State turned out over 50,000 flasks, each containing 76½ pounds of quicksilver, and worth on an average 35 cents a pound.

Iron.

During the past year more attention has been paid to the iron resources of California than ever before, and in iron manufacture particularly there is a very gratifying increase. The unfortunate fire at the Clipper Gap works of the California Iron and Steel Co. gave the infant iron industry a very severe setback, but the works are being rebuilt. It is expected that they will commence smelting about April 1st with a capacity of 50½ of the present consumption of the State. This is something which has long been looked forward to, and it is gratifying to note that the public spirited and progressive men who inaugurated these important works have every prospect of reaping an abundant reward, notwithstanding the misfortune experienced in the burning of these works. The iron made is of such a superior character that it meets a ready sale. When these works, with the Oregon and Puget Sound furnaces, are all in operation, this coast will produce a large proportion of the iron for its own use. As we have been long dependent on other markets for our iron, this change is a very gratifying one. The private circular of J. W. Harrison reviews at length the pig iron trade of San Francisco for the past year. Spot lots have rarely been as low as the price for loading, though there has been a steady decline in both throughout the year. About 80 per cent. of the iron melted here is known as Glengarnock, and this has declined from \$85 last January to \$28 in December. The Oswego furnaces in Oregon have passed into new hands, and the product hereafter will be converted into steel and used mainly in Oregon. The Oswego furnaces this year sent about 3,200 tons of pig iron to San Francisco, which realized an average of \$31 per ton. The imports here of all kinds for the past six years and the highest and lowest prices for Glengarnock in each year will be found annexed:

	Highest.	Lowest	Imports
1877, per ton	\$84.50	\$28.00	17,473
1878, " "	81.00	25.50	11,017
1879, " "	84.00	24.00	9,150
1880, " "	88.00	26.00	13,202
1881, " "	30.00	24.50	8,600
1882, " "	85.00	23.00	10,093

The average price for the six years is \$29.70 per ton, and the average imports have been 13,279 tons. The imports for the past year are the largest in the history of the trade. The consumption was also larger than in any previous year, amounting to 20,159 tons. The stock on hand at the close is 8,108 tons, and the quantity afloat 4,337 tons. The present stock is 5,000 tons less than the average for the past six years. There are strong indications that more iron will be melted in 1883 than in 1882. The Puget Sound furnaces will begin melting in a few weeks with increased capacity.

Quicksilver.

California is the only producer of quicksilver in the United States, the rest of the world's supply coming mainly from Spain. The quicksilver industry is somewhat depressed here just now, all of the mines not being at work. This is due to the metal being on the free list, and Congress has been petitioning to restore the duty. Two weeks since we had quite an extended article on the quicksilver industry in California, and need not now go over the ground again. The estimate of production of this metal in California this year is about 50,000 flasks of 76½ pounds each. The producing mines of the State, with their yield for 1882, as follows:

	Flasks.
New Almaden	25,807
New Idria	1,954
Redington	2,223
Sulphur Bank	5,133
Guadalupe	1,138
Great Western	5,279
Napa Con.	6,838
Great Eastern	2,127
Various mines	256

The figures given for the New Almaden are not authentic, the manager declining to make the product public; but the others are correct. Our exports this year were 34,770 flasks, and the following table will show our previous exports:

	Flasks.		Flasks.
In 1852.	900	In 1868.	44 606
In 1853	12 737	In 1869	24 415
In 1854	20 908	In 1870	13 788
In 1855	27 165	In 1871	15 205
In 1856	23 747	In 1872	13 080
In 1857	27 262	In 1873	6 350
In 1858	24 142	In 1874	6 770
In 1859	3 399	In 1875	29 909
In 1860	9 448	In 1876	41 140
In 1861	35 906	In 1877	40 280
In 1862	33 747	In 1878	34 280
In 1863	26 014	In 1879	52 180
In 1864	36 027	In 1880	31 648
In 1865	42 469	In 1881	35 260
In 1866	30 237	In 1882	34 770
In 1867	28 853		

The Commercial Herald says: Our production this year is 10,000 flasks less than for the year 1881, and nearly 30,000 less than in 1877, the year of the greatest production of this article. That of the Almaden mine, in Spain, for the year 1882 is not published as yet, but may be safely estimated the same, or more, as in the year 1881, 50,000, and this is understood to be all forwarded to the Rothschilds, in London. According to the London Board of Trade, returns for November, 1882, the receipts there for the first 11 months were 45,121 flasks; for the corresponding period in 1881, 47,573, and in 1880, 49,247, showing a slight decrease. To the quantity produced here and in Spain together, 100,000 flasks or more, should be added 10,000 to 12,000 furnished by the Idria mine, in Australia, making altogether as the world's production for the year, 10,000 to 15,000 flasks.

The question naturally arises, what becomes of this large stock, over 4,000 tons of metal?

Our monthly receipts at San Francisco are as follows:

Month.	1881.	1882.
	Flasks.	Flasks.
January	4,870	4,053
February	3,124	2,635
March	4,294	3,432
April	4,268	3,682
May	6,742	4,286
June	5,135	4,258
July	4,543	4,131
August	4,410	4,178
September	4,270	4,153
October	4,302	4,180
November	2,780	3,160
December	4,703	3,202

Totals	53,250	45,310
Shipped direct from mine to Eastern States & Nevada	6,385	5,510

Total production 58,635 50,820

Copper.

In a comparatively condensed review like this it is impossible to go into the question of copper product as freely as the importance of the subject warrants. There is a sort of copper "boom" just now, and many mines are being opened. We shall reserve for a future number a more full review of the subject. No furnace work has been done in this State, that branch of the business being still confined, as far as this coast is concerned, to Arizona, and in a limited manner to Nevada. The copper Queen, Clifton and Globe districts in Arizona are now producing at the rate of about 16,000,000 lbs. per annum of copper bullion, a great portion of which now seeks the Eastern market direct over the Southern roads. Copper cement production, says the *Commercial Herald*, is still limited to the Spencerville and Newton mines, and amounts to about 600 tons per annum, averaging 90 metallic copper; but works are now being erected by the Campo Seco Co. in Calaveras county with a capacity of 20 to 30 tons per month. The latter mining camp (Campo Seco) has come somewhat into notoriety during the past year by the re-opening of two old mines formerly worked in that district, viz: the Campo Seco mine by a corporate company, who are putting up reduction works as above stated, and the "Satellite," formerly the "Lancha Plana."

The production of this metal on the Pacific slope has been greatly increased this past year, until it has reached an output equal to 10,000 tons fine copper, as follows:

	Tons Fine Copper.
California area and cement (precipitate)	600
Nevada ores and bars	800
Arizona	8,600
Total	10,000

New mines have been discovered and worked, and numerous smelting furnaces have been erected all over the coast, especially in Arizona, while the old producers, as the "Copper Queen" and the "Longfellow" mines have increased their product considerably. The "Copper Queen" has turned out 4,200 tons bars, averaging 96½%; "Longfellow" about 2,000 tons, 92%; "Detroit" about 500 tons, and "Old Globe and Dominion" about 1,500 tons bars, about 95% fine. In California the principal producer is the "San Francisco Copper Mine," at Spencer-ville.

Coal.

San Francisco, from its geographical position, is an important coal market. California itself, while a comparatively insignificant coal producer, still does produce somewhere near 100,000 tons a year. But the coal fields of Puget Sound and British Columbia are near at hand, and the mines there are being gradually opened and developed, so that they now produce much more than formerly. Most of these mines are owned by San Francisco capitalists. A change within the past few years has taken place in the method of transportation of the coals to this port, steam colliers having taken the place of the old worn out barks which formerly did all the trade. This fleet of steam colliers is steadily increasing, and as it does our receipts of English coal fall off. We will always, however, receive large quantities of English coal by the vessels which come here in search of wheat cargo. According to the private circular of J. W. Harrison, the receipts for the past year were about \$46,000 tons as follows:

Coco Bay and Renton tons	39,100
Carbon Hill	54,400
Seattle	146,300
Mount Diablo	80,200
Eastern (Cumberland and Anthracite)	43,500
British Columbia	151,800
English and Welsh	138,575
Scotch	28,878
Australian	163,127
Total	845,880

There have been radical changes in the sources of supply as compared with 1881. The quantity from England shows a falling off of 92,400 tons, while from Australia, there has been a gain of 39,500 tons, and from British Columbia and Puget Sound a gain of 62,000 tons.

COLORADO.

The bullion product of Colorado for the past year shows a most marked increase over the product of 1881—having reached the large total of \$26,750,898 against \$22,000,000, the largest yield of any previous year. It may be of interest to our readers to note the gradual increase of the bullion product of this State since the discovery of the Leadville mines. For several years previous to 1877 the annual product had varied from six to eight millions of dollars. In 1877 the output was in round numbers \$7,000,000; in 1878 it was \$10,000,000; in 1879, \$15,

000,000; in 1880, \$22,000,000; in 1881, \$22,000,000; and in 1882, as already stated, it is about \$26,750,898. This is a very gratifying progression, especially in view of the fact that a large portion of the increase has been derived from new localities, where little beyond prospecting or "dead work" has as yet been done.

An Immense Mineral Field.

For many years mining in Colorado was principally confined to the central portion of the State, near to the locality of the original discoveries. Of late years prospectors have pushed out in all directions until every portion of the eastern slope of the Rocky mountains, from the very northern limits of the State to its southern boundary, is known to be rich in minerals of every kind. Not only gold and silver, but lead, copper, iron and coal are everywhere found. During the past three or four years prospectors have passed over the summit at several points, and almost invariably found the western slope quite as rich in minerals as the eastern. Much of the growing prosperity of Colorado is due to the energy and enterprise of her railroad men, who are constantly extending the facilities of transportation in every direction throughout the mountains. The railroad engineer trends closely on the heels of the prospector.

Improved Methods.

According to the *Tribune*, grades of ore are now being worked in Colorado at all the smelting and reduction works which could not be made to yield profitable margins two or three years ago. Scores of waste dumps, containing the accumulations of many years, have been assorted over, and thousands of tons gathered which gave the most gratifying returns. All this is the direct result of the introduction of methodical systems, and improvements added to every detail of the business, interjected or at least rendered possible by the extension of railways to nearly every principal mining camp. Take away these influences, restore the primitive methods and the expense incident thereto, and it would paralyze the whole industry. Ores which contain \$20 in silver per ton are now worked at a profit. Indeed, the greater part of the dividends paid are derived from this material. It forms the great wealth of the mines, for the high grades run in small seams and streaks, forming an insignificant feature of the whole mass of vein matter. Cheap transportation and the enlargement of facilities for reduction followed as a natural consequence of the period and its steam-carriage innovations. The concentration of power at a few points where open markets with active bidders contend for every ton of valuable ore produced, has wrought most salutary changes. If a mine is worth working at all it will yield material that can be marketed profitably if within easy reach of a railway.

The Leadville Mines

Are still increasing the aggregate of their yield. We give the following summary of the yield of this remarkable deposit since 1860:

1860 to 1870, gold from placers	\$0,400,000 00
1874, gold and silver	145,000 00
1875, gold and silver	113,000 00
1876, gold, silver and lead	85,000 00
1877, gold, silver and lead	555,330 00
1878, gold, silver and lead	3,152,025 00
1879, gold, silver and lead	10,333,749 00
1880, gold, silver and lead	11,187,097 00
1881, gold, silver and lead	13,170,576 00
1882, gold, silver and lead	10,393,255 00
Total	\$64,536,526 00

The San Juan Country.

Next to Leadville the greatest increase of yield is in what is known as the San Juan country, comprising the five southeastern counties of the State, and the locality where the most recent important discoveries have been made. These counties and the progress made in their development has recently been fully recorded in our Denver Exposition letters. The yield of this district for 1881 was reported at the paltry sum of \$40,000, while that of 1882 is \$675,000. This yield is mostly for ores shipped to distant furnaces, which could not be moved until the locomotive reached Silverton on the 4th of July last.

The recent discoveries on Red Mountain have contributed much high grade ore to the general yield of this district; but the principal cause of the increased showing is in the fact that when the road to market was opened many mines which had been under development for years without reward to the owners, because the value of their mineral was exhausted by charges for transportation and treatment, began to be operated in earnest, and with satisfactory results came new power for systematic enlargement.

A Grand Mining Country.

Taken as a whole, there is no mining region of equal extent in the world which can present so large and varied an exhibit of the precious metals in all their various combinations as Colorado, or so large an aggregate of yield. In the returns for 1882 no less than 19 counties figure in the list as producing the precious metals. These counties cover an area nearly if not quite equal to the entire mineral region of California, with an immense area of country on the western slope of the Rocky Mountain Divide on which the prospector has as yet scarcely set his foot.

In order to show the general diffusion of the minerals throughout the State we herewith append the

Bullion Product by Counties.

The bullion product of the State for 1882 was as follows:

Counties.	Amount.
Boulder.....	\$550,000
Chaffee.....	225,500
Custer.....	705,116
Clear Creek.....	2,001,629
Dolores.....	125,000
Fremont.....	19,960
Gila.....	2,006,516
Grand.....	10,000
Gunnison.....	600,000
Hinsdale.....	275,000
Lake.....	17,131,853
La Plata, San Juan.....	675,000
Ouray.....	329,760
Park.....	283,564
Pitkin.....	100,000
Rio Grande.....	310,000
Routt.....	100,000
Saguache.....	62,000
Summit.....	1,250,000
Total.....	\$29,750,898

Nearly all the counties which report a yield of \$125,000, or less, are those in which mining is just beginning to be developed, and yet, notwithstanding all that has already been done, the *Tribune* truly remarks that Colorado

Is Still in its Infancy.

In regard to the unrivaled industry of mining as a pursuit—only two shafts have penetrated the fissures to the depth of 1,300 ft., and not more than six or eight to the depth of 1,000 ft. The major part of our 26½ millions for this year came from mines less than 500 ft. from the surface. It must be understood also that all operators work for immediate gains. In other words, when a body of paying mineral is exposed by underground exploration it is stopped out for what it will yield, rather than left as reserve force for stock operations on the mining exchanges. The expense of a mine is in the amount of dead work required to expose reserves. A shaft determines nothing but the character and strength of the vein matter, yields nothing in comparison to its cost. It is in the stopes opened by levels where the profits are derived, because they contain values which can be measured and readily converted into coin. If all the fissure mines could be penetrated to the depth of 1,000 ft., and levels driven to the full extent of their ore chutes at intervals of 100 ft. before any stoping was done, a work requiring a large expenditure of capital without recompense, and from three to five years' time under the most favorable conditions, the output for the succeeding five years would be enormous. But mines cannot be worked in this manner. Consequently each owner or corporation conducts operations with an eye single to the benefits derivable from day to day. When the reserves are at hand he is happy in the possession of a plethora of bank account, and when exhausted he must needs hunt for more.

Future Stability.

In conclusion, continues the *Tribune*, we believe that unless serious injury shall be inflicted upon the mining industry by causes now operating against the price of lead and silver for a considerable period, this pursuit will be even more prosperous during 1883 than any former period. We are dependent to a greater degree than some are willing to admit upon the maintenance of the values of these metals which have prevailed for the past three or four years. The removal of the present tariff on lead or any material reduction would bring serious consequences, because we are producing more than one-half of the entire lead product of the United States. The demonetization of silver would close the mines and depopulate the districts.

Colorado Smelting Works.

There are three great smelting establishments in Colorado that are kept in constant blast to their fullest extent—the aggregate capacity of which has been nearly doubled during the past year. We give their products for 1882, so far as it has come to our knowledge, as follows:

Argo works.....	\$3,668,000
Pueblo works.....	3,272,405
Grant works (70 days).....	1,337,220
Two smelters at Golden.....	1,190,043
The La Plata, Arkansas Valley, Cummings and Fair.....	6,929,863
Total.....	\$15,404,531

There are many other smelting works scattered through various portions of the mines from which we have no returns. The Grant works are new and had run but 70 days up to Jan. 1, 1883. There are three smelters at Golden, but we have returns from only two. A considerable amount of ore from Utah and other localities is treated at the Argo works. The Pueblo works receive large amounts of ore from New Mexico and Arizona, the product of which appears in their total of returns. In the above total of furnace products there is no return from ores treated at the furnaces in Leadville.

Coal in Colorado.

The deposits of coal in Colorado are practically inexhaustible. They are found in nearly every section of the State, at and above the foothills of the Rocky mountains. The northern coal belt is a free-burning, semi-bituminous coal of air quality for heating and domestic purposes. This coal is sold in Denver city at from \$3 and upwards per ton. Most of the coal consumed in Denver is from this deposit. This coal is shipped east as far as Omaha. Arbitrary railroad rates prevent its going further. The product of this region the past year has been about \$550,000, which has brought an average of \$2.50 per ton at the mine.

The Middle Coal Region

Lies between the foothills west of Denver and the Colorado springs. This is also a fair domestic coal, and crops out at numerous points along the region designated, although but little has been as yet done in the way of its development.

The Southern Belt

Produces a superior article of coal, most of which is of a fine quality for coking. At Starkville, five miles from Trinidad, on the Atchison, Topeka & Santa Fe railroad, 100,000 tons were produced last year. Most of this coal was sent to the South and West. The value of this coal on cars at the mine is about \$2 per ton. At the same point 40 coke ovens are running, and these have produced about 225 tons of coke, worth \$4.50, which has been sent wholly into Arizona. They have not been able to fill all their orders for either coal or coke. The mines at Eagle will have shipped about 400,000 tons of coal, worth \$2 on cars at the mine at El Moro, and about 12,000 tons of coke, worth at El Moro \$4.50 per ton. Chappell & John's mine, south of Trinidad, has turned out 20,000 tons.

The Canyon Region.

The superior qualities of the Canyon coal are too well known to require notice in this hurried review. The belt includes the valley of the Arkansas, and is mainly, if not wholly, confined to Fremont county. The region is one of the oldest in the State, and the development is large, and the exhaustless character of the deposits have been proved. The output of this region for the year has been about 160,000 tons. The value at the mines is from \$2 to \$2.50 per ton.

The Gunnison Coal.

Gunnison county furnishes the most important coal-field in the State, whether in quantity or quality, the development of which is being rapidly made. This coal is both soft, or coking, and anthracite. During the past year 43,000 tons of soft coal have been raised and disposed of. Fully 10,000 tons of coke were produced in 1882 from this coal by one company—the Colorado Coal and Iron Co. The anthracite deposits have not as yet been largely worked, and only 2,000 tons have been marketed during the past year. There are five workable seams at one locality in Gunnison county—the Crested Butte—running from 3 to 15 ft. in thickness. Besides this locality there are hundreds of square miles of equally valuable soft coal in Gunnison county.

The anthracite of this county also covers an extensive territory, but it is not all of what may be considered a good quality. The anthracite interest of Colorado is just beginning to be developed. One of the companies, now actively at work, is putting up improved machinery—breakers and screens—with which it will soon be able to furnish from 200 to 300 tons per day. The coal belonging to this company is in all respects equal to the production of the best grades of steel, as has been fully proven at the Pueblo Iron and Steel Works.

Iron Products, Etc.

In addition to her other products, Colorado has also turned out during the past year from 53,000 tons of iron ore 24,000 tons of pig iron, which has been converted into 16,139 tons of steel rails, 3,883 tons of merchant iron and 2,752 tons of miscellaneous castings, 1,253 tons of muck bar, 16,155 kegs of nails and 5,022 kegs of spikes. With her immense resources of coal and iron ore Colorado promises in the near future to become one of the largest iron-producing States in the Union. The total railroad investment within the State reaches the enormous amount of over \$95,000,000 in value, the total length of the track being 1,397 miles, the gross receipts from which for the past year were \$9,135,544, which gave net earnings to the amount of \$3,654,816.

State School of Mines.

It is eminently proper that Colorado, which produces more of the precious metals than any other State or Territory, should have a State School of Mines, where a thorough education in chemistry and metallurgy, together with a practical knowledge of mineral geology and of the science of the reduction of ores may be obtained. This advantage Colorado now possesses.

The report of the operations of the school shows that the number of students in attendance is more than double that of two years ago, and that a large number of students who have graduated at Harvard University, the United States Naval Academy and other colleges of the highest standing are pursuing regular courses at this institution, which is good evidence that it is accomplishing well the purposes for which it is established. The large increase in the number of students compelled the management to either continue the school without sufficient room for any department of work or enlarge the building to meet the additional requirements. They determined upon making the addition, which is now nearly completed, and which will about double the building accommodations of the school.

NEVADA.

Nevada shows a falling off of \$1,484,188—the yield of the Comstock being \$1,333,018 as against \$1,726,162 in 1881, a decrease of \$393,144. Yet she still maintains her third place in the list of bullion producers, as she has since the Leadville mines of Colorado put that State at the head. Perhaps the situation in Nevada is best summarized by a quotation from the inaugural address of Governor Kinkadee delivered a few weeks since: "We have had no wild ex-

citements, as in previous years, over alleged vast mining discoveries, which have benefited the wary few at the expense of the credulous multitude. Stock gambling is not so prevalent as formerly. The mines have yielded fair returns in most localities, and in several the present bullion output is larger than ever heretofore. Legitimate mining is taking the place of stock speculation; new and prosperous mining districts are being organized, giving employment to many, and inviting the attention of capital to safe and profitable investment. The result must be beneficial to the State; its revenue will augment, and its population permanently increase. The growth of all other branches of business in our State depends, in great degree, upon extended and successful mining operations. Our neighboring States and Territories, through public spirit, private enterprise and fair railway charges, prompt inducements to investigation of their mineral resources, and offer reasonable guarantees for the safety and protection of capital from abroad to aid in the development of this important interest. I believe our State unequaled in the extent and variety of her mineral wealth. Much of this lies dormant for lack of capital and transportation facilities. The decline in the production of the great Comstock lode (which I trust will not be permanent) has, through unjust comparison, greatly retarded the prosecution of the mining industry in other portions of the State. In several districts remote from the Comstock mines are now being opened that give promise of a large bullion product in the near future. Improved machinery will utilize and render valuable our low grade and hitherto unproductive ores and ensure a more extended and profitable industry.

The product of Euroka district last year was \$3,176,700, a decrease of \$953,100 from 1881. This camp produced more than the Comstock last year.

The demands on Nevada last year were as follows:

Alexander.....	1	\$100,000
Bristol.....	1	14,000
Exchange.....	1	3,000
Eureka Con.....	4	75,000
Indian Queen.....	7	25,625
Nevada.....	4	15,000
Northern Belle.....	6	25,000
Richmond Con.....	3	270,000
Total.....	29	\$787,625
In 1881.....	56	1,397,500

As to the Comstock the *Enterprise* thus summarizes the situation:

In the California and Consolidated Virginia there is now open on the 2,700 and 2,500 levels about 1,300 feet of new ground—the California claim being 600 and the Consolidated Virginia 710 feet in width.

In the Best and Belcher mine there are 540 feet; Gould and Curry, 612; Savage, 771; Hale and Norcross, 400; Chollar, 700, and Potosi, 700, making in all, from the south line of the Potosi to the north end of the Sierra Nevada drift (2,700 level), a little over 8,000 feet of ground along the lode which, with but few and short breaks, is now open for exploration on levels ranging in depth from 2,500 to 2,900 feet.

In the opening out of these several deep levels by means of long main working and deep ventilating drifts, our leading mining companies have at last reached a point toward which they have been striving during the past four years. Just now, when the grand object has been attained, it is rather curious to see the stock of the several mines lower in price and apparently in public estimation than at any time since the commencement of operations looking to the opening out of these deep levels.

A year or two ago an impatient public in its mind's eye saw already completed the work not yet wholly finished, and began investing. No doubt almost every person who then invested thought he was putting in his money just in the "nick of time" and expected to see his pet stock go up the next day or the next week at the furthest. Those who thus invested have grown heart-sick at the long delay. Many have sold their stocks and many have had them sold by brokers. Some have doubtless held on through all discouragements (and assessments), but they have neither been in a condition or the humor to buy more stocks and thus assist in keeping up prices.

Now, when that is about to be done to which all have been looking forward, and when the proper time for investing has arrived, the masses are so much exhausted through their premature efforts, and so disgusted on account of their bad luck, that they look with suspicious eye upon Opportunity, though she turns toward them the handle of the jug. Had those who began the fight a year or two ago reserved their fire until the present time, their ammunition might have done gratifying execution.

Those who now put their money into stocks, whether or not they make fortunes, will have the satisfaction of knowing that they made their venture at the best time that could have been selected and at a price so low that any further decline would be impossible without the stocks going off the Board and out of sight entirely.

In Humboldt county the mining outlook is better than at any previous time for years. Rich ores have again been found in mines which have not been worked for two or three years. It is stated with certainty that work will be resumed on the Arizona mine, at Unionville, where large bodies of rich ore have been found while working the annual assessments. This mine will give employment directly and indirectly to many men and reinhabit the camp where it is situated. The Paradise mines are also looking better, and it is hoped that work will be resumed on the Paradise Valley and other pro-

ductive mines in the district before long. Willow Creek, a new and promising mining camp, is also coming to the front, and will be producing bullion within the present month. The Auburn and Lang Syne companies, at Dun Glen, are expected to resume operations on their mines ere long, and it is reasonably hoped that the season of greatest mining depression is at an end.

We have been giving every week descriptions of the mines in the various camps of the State, and have only room here for a few general remarks. As to the southern counties of Nevada, Mr. E. T. George, who lately visited them, says: During our trip through the southern part of Nevada we were surprised at the number of reduction works that had been erected in the different mining camps and lying idle, monuments of folly and mismanagement. If one-fourth of the amount of capital had been expended in exploring the mines that has been wasted in erecting those expensive works, our State would to-day be the greatest bullion producer in the world. Valuable mines are lying idle which, if worked on legitimate business principles, would be dividend payers, but useless expenditures and gross mismanagement have caused stockholders to refuse to contribute any further funds, and the mines and mills have become almost uninhabited, where heretofore all was life and bustle, and not on account of the merits or demerits of the mines, but simply for the incapacity and make-all-own-can-for-yourself management. Nevada has had "wild cat and stock jobbery" enough.

While our neighboring mineral States are enjoying a season of prosperity Nevada is undergoing a season of dullness unparalleled in her history, and through no fault of her mines or mineral wealth. We believe that our State is the best mineralized State or Territory in the Union, if properly worked, and in all our principal mining camps it has been proven beyond a doubt that our mineral veins are continued to as great a depth as in any other country in the world. Then why should so many of our mines be lying idle to-day? Let any person who has been a resident of those camps answer the question. Is it through the mines giving out, or on account of the poverty of the ore? Can they truthfully say yes in either case? There may be some few exceptions, but the greater number will have to be laid to the incapacity of the management and useless expenditures in salaries to non-producers. How many mines are there whose pay-rolls for miners and mill men equal the amount paid out to superintendents. Mining can be made a paying business, and will pay a larger rate of interest on the amount invested than almost any other business, but must be conducted on the same business principles that any other business is conducted on; then, and not till then, will our State return to its old prosperity, and it should be the endeavor of all interested in mining and the welfare of the State of Nevada, to do all in their power to encourage legitimate mining and discourage wildcat schemes and stock jobbery.

The Carson and Colorado railroad will open up all the districts in southwestern Nevada and help the State out wonderfully. The region traversed by this road abounds in mineral, but the camps have languished owing to lack of transportation facilities. With this new road running, however, these difficulties will be overcome. The copper resources of the region alone would be sufficient to make a prosperous one, but there are many other minerals as well. There is little doubt that Nevada will again resume her vigor when the present temporary depression wears away. She is doing now a great deal more bullion producing than many of the more advertised States and Territories, standing, as we have said, third on the list.

ARIZONA.

As will be seen by Wells, Fargo & Co's estimate of bullion product, Arizona yielded in 1882 \$9,298,207. The estimates made in Arizona considerably exceed the amount. The following table prepared for the Tucson *Star's* annual edition shows a different result:

The gold and silver output of Tombstone takes the first rank, after which comes the copper output of the Territory, and third, the gold and silver reported from the Territory at large, and lastly, estimated output not reported, the whole footing up \$11,702,294.28.

Tabulated Statement.

Silver King, silver bullion.....	\$375,000 00
Silver King, concentrations.....	400,000 00
Tip Top, silver.....	243,081 00
McMorris.....	281,024 00
Pioneer.....	38,765 00
Arizona Central, gold (estimated).....	425,000 00
Silver bullion shipped from Pima per W. F. & Co.	76,409 00
Gold bullion and dust shipped from Pima per W. F. & Co.....	75,208 20
Silver shipped from Pima per W. F. & Co.....	13,379 60
Gold bullion and dust shipped from Yuma per W. F. & Co.....	14,472 00
Ore shipments via Yuma.....	25,560 00
Ore shipments via Casa Grande.....	25,560 00
Total.....	\$2,254,133 53

Tombstone.

Contention.....	\$1,680,512 13
Grand Central.....	1,335,220 35
Stonewall (eight months run).....	240,000 00
Boston mill (custom).....	165,000 00
Cirad mill and mine (and custom).....	177,540 00
Tombstone M. and M. Co.....	1,440,594 00
Head Center (eight months run).....	125,173 81
Waterwheel mill (two months run).....	15,000 00
Total of Tombstone.....	\$3,202,876 35

Copper Output.

	Pounds.
Copper Queen Co., operating the Copper Queen mine, in Cochise county, Warren district.....	8,045,320
Arizona Copper Mining Co., operating the Longfellow and Coronado mines in Graham county, Clifton district.....	4,325,000

Old Dominion Copper Mining Co., operating the Old Gila and Dominion mines, Gila county, Arizona	1,940,000
Buffalo M. and S. Co., operating in Globe district, Arizona	431,400
Pima County Copper Mining Co., operating in Pima county, Silver Bell district, Arizona	961,500
Columbia Copper Mining Co., operating the Bulldozer and other mines in Pima county, Santa Rita district, Arizona	418,000
Russell Gold, Silver and Copper Mining Co., operating the Peabody mine, in Cochise county, Dragoon district, Arizona	264,656
Delmont, operating in Clifton district (estimated)	250,000
Long Island Copper Co., operating in Gila county, Globe district, Arizona	453,680
Total value of copper	\$2,915,354.40
Total of Tombstone	\$5,302,876.35
Value of outside districts	2,634,133.53
Value of copper bullion	2,945,254.40
Estimated output not reported	1,500,000.00
Grand total	\$11,702,234.28

These figures show the product of the principal camps, but many small mines not mentioned are at work. A great deal of prospecting is now being done in Arizona, and within a year many more mines will be developed. One difficulty now is that where there are a number of prospects partly opened the men have not money enough to go on with the work.

It will be noticed that the copper output of the Territory is now very large. It is, moreover, increasing, and will no doubt be doubled before very long.

Our space will not warrant mention of all the mines in the Territory, or even the districts. We have during the past year paid a great deal of attention to the mines of Arizona, and given, from week to week, all the general news. We now, therefore, only sum up the results.

The principal camp, Tombstone, has not done what was expected of it. There were several reasons why the yield did not yield \$5,000,000. First came litigation, closing down three mines for the greater part of the year, and second, the closing down of one of the Tombstone Mill and Mining Co.'s mills the 1st of May, which reduced that company's output by about \$1,000,000. To partially make up for the deficit, the Stonewall mine, which was purchased by the Boston and Arizona Smelting and Reduction Co., was opened out and became quite a large producer, and several other claims were put upon a paying basis in a small way. The total output was \$5,302,876.35. If the Head Center-Tranquility starts up within any reasonable season, it should add at least \$1,000,000 to the present year's product, and then Way Up, Ingersoll, Luck Sure, Little Devil, Blue Jacket and Contact will come in to swell the amount, so that this year's yield ought to approximate \$7,000,000.

There are many prosperous camps in the Territory of which very little is said. Of most of these we have published notes from time to time. The smaller mines, which furnish no figures of bullion product, but which yield more or less each year, are those which keep a large population of miners at work and in which the miners themselves are generally interested. Of this large class it is impossible within the limits of a review like this to say very much. Arizona promises to increase her yield of bullion annually for many years to come.

NEW MEXICO.

New Mexico rolls up \$3,067,132 as her bullion product this year, a very respectable showing, placing her number seven on the list of bullion producers. Last year the Territory produced \$814,244, and the year before that only \$711,300. The increase of 1882 was therefore very marked and quite satisfactory. The region labors under the difficulty of being new as a mining field. That is, it is only of late that it has attracted much attention from capital. Even now capital has come in more slowly than should be, and there are many properties waiting buyers. It is stated, however, that the development is retarded by reason of so many persons holding ground and only doing assessment work on it. The Commissioner of Immigration of New Mexico, Chas. W. Greene, says, in speaking of mining in 1882: Looking back over the year just closed we find a marked progress in development of the mining industry of this Territory. At the beginning of the year almost everything that could be said of it was of its prosperity in the distant past, or of its hope for the future under the new regime just inaugurated. The practical questions were often asked: "Where is the product of the mines, for which so much is promised?" "Why no output from the large number of mines you tell us about?" Save the operations at Georgetown, Santa Rita and Silver City, and for a brief period at Socorro, there was no real mine production, and but little practical mining. Smelters were talked about, and mills in several parts of the Territory. One had been built and was standing idle at Cerrillos; another, the Duray, had proved a failure at Bonanza City; another had been built and was making spasmodic efforts to obtain ore at Socorro; another novel electric process was about being tried at White Oaks; a small mill had been built at the same place, but had not been successfully operated. Prospects by thousands had been located and recorded; upon some of them two or three assessments had been worked; on much the larger proportion only one assessment, if any, had been worked. Mines, in the full sense of the word, were very few and far between.

To one who has watched the changes of the year, there has been much to encourage and but little to disappoint. The advance has been steady; there have been but few failures, and where either labor or capital has been employed it has generally yielded gratifying results.

There is no accessible record, and necessarily the observation of any one person covering the whole field must be somewhat cursory and imperfect. There is enough, however, at command to make good the assertion that more has been accomplished within the one year than in all the preceding time since the industry was newly established.

UTAH.

Utah Territory is one of those which shows a gain in bullion production this year. The mineral yield is the highest experienced. The mines seem to be in a prosperous condition, and to be advancing to development in an exceedingly satisfactory manner. The Salt Lake Tribune is sued on the 1st inst. an edition in which were very elaborate special articles, describing in detail the work of all the mines in the various districts. This made a voluminous review of the mining industry of Utah very creditable in every way. We are unable, of course, to go into details about the 80 mining camps of the Territory, but collate from the Tribune an abstract which shows general results.

The totals of values of bullion produced are as follows:

Value of product of 1882	\$5,143,175
Value of product of 1881	7,353,658

Excess of 1882..... \$789,517

The most of the increase must be credited to lead and copper, the product of silver being as follows:

Ounces in 1882.....	5,435,441
Ounces in 1881.....	5,406,191

Being but a trifling gain. But the gain of this year is a Utah gain, which could not quite have been said of the gain of 1881 over the year before.

In 1881 there were received from Idaho, Montana and Nevada nearly 2,000 tons of lead, 441,846 ounces silver and 976 ounces of gold, all of which went to swell the bullion statement for Utah of that year. But for 1882 the amount of ore received from points outside this Territory has been so insignificant that it wasn't worth while to state it. The statement, therefore, is an unusually gratifying one, not only as to the large aggregate produced, but also from the fact that it shows an increase for Utah mines much greater than the simple comparison of the aggregates would indicate. Thus, the product in lead shown in the general statement is, in pounds:

For 1882.....	52,849,850
For 1881.....	42,101,625

Increase..... 10,748,225

But to get the actual increase of Utah production, the 3,969,440 received in 1881 from outside the Territory must be added to the balance shown, making the increase for Utah 14,127,665 lbs.

In like manner, the general aggregate shows an increase of but 35,253 ounces in silver; but if from the product of 1881 we deduct the 441,846 ounces received from our neighbors in 1881, to balance which there were no receipts from the outside for 1882, we perceive the real increase in Utah's silver output to be 477,099 ounces, or a handsome margin over half a million dollars. The above values are given on a basis of Utah value; about 25% must be added for the sea-coast value. The general situation, then, is one of great prosperity and satisfactory growth.

The Smelters.

The great smelters not working in connection with any mine or mining company are the Germania, the Hanauer and the Mingo.

The Germania shows a production the past year of 8,213,789 lbs. of refined lead, against 2,645,373 lbs. the year before; 561,777 lbs. unrefined lead, against 3,687,284 for 1881; 388,614 ounces silver, against 349,479 the year before, and 815 ounces gold, against 508 ozs. in 1881. This shows an enormous gain in lead production, especially refined lead; and a handsome gain in silver and gold.

The Hanauer smelter produced 5,602,324 lbs. unrefined lead, against 3,015,228 lbs. in 1881; 254,339 ounces silver and 1,384 ounces gold, against 176,320 ounces silver and 438 ounces gold the year before.

The Mingo furnace produced 10,128,738 lbs. unrefined lead in 1882, against 11,977,649 lbs. in 1881; 316,309 ounces silver against 437,176 ounces the year before; and 816 ounces gold against 832 ounces.

Park City.

For many years Park City has been the leading mining district in Utah, and the Ontario has been its mainstay and life. The Ontario is one of the few great mines of the world. It has a record of steady dividends and never an assessment. It has produced an aggregate of \$12,295,265.92 in silver, and has paid \$6,150,000 monthly dividends, amounting to \$5,150,000. For the year just closed its product has been 1,522,664 ounces of silver, compared with 1,909,870 ounces in 1881. The product of the company is only gauged by the capacity of the mill to reduce the ore. This milling capacity is to be doubled next summer by the erection of a new mill of equal capacity with the present one. The value of the Ontario product at the standard adopted by Wells & Fargo (\$1.123 per ounce) amounted to \$2,084,246.90. From this have come 12 regular monthly dividends of \$150,000 each or \$900,000.

Another company which, by the recent settlement of conflicting claims and titles, has become a fine producer is the Crescent, shipping both ore and bullion. Its product, however, is not stated separately.

Other properties in Park City and vicinity are fully treated of in the special article in this issue devoted to that camp.

Frisco District.

The great Horn Silver mine is in this district; it has much the largest mass of ore in sight of any mine now being worked anywhere. Within the year just closed the company which owns this mine has overhauled and passed its great Utah rival, the Ontario. The product of the Horn Silver for 1882 was 1,620,357 ounces silver, and 32,003,775 lbs. lead, against 1,259,903 ounces silver and 16,343,995 lbs. lead in 1881. Value of silver, 1882, \$1,882,901.62; value of lead, at \$52 per ton, \$832,052; aggregate value of product, \$2,654,953.62. But this is the Utah valuation; at the seaboard the company actually received for its product considerably more. It received \$2,521,687.68 for 1,255,111.32 ounces of silver and 11,803 tons of lead sold up to September 30th, 1882, the sum of \$2,521,687.68. At the same ratio, its added product since would bring the total of sales up to \$3,311,686.80. From this there have been paid four regular quarterly dividends of \$300,000 each, aggregating \$1,200,000, and another dividend of the same amount is due February 15th, and will doubtless be paid promptly.

The Frisco Mining and Smelting Company's product for the year was just about the same as last year, being 3,027,424 lbs. lead and 214,320 ounces silver. But in gold it made a jump from 425 ounces in 1881 to 882 ounces in 1882.

Silver Reef.

The product of Silver Reef is steady, being 621,879 ounces for the year just closed, against 614,368 ounces, for the year before. The camp is holding out well in permanence, and will from all appearances be a regular producer to the extent of nearly three-quarters of a million dollars annually.

Tintic District.

The independent producers of this district are the Mammoth and the Tintic Mining and Milling Co. To the former is to be credited the matte reported in Wells, Fargo & Co.'s tables, 605,880 lbs., with 67,320 ounces silver and 1,683 ounces gold; a clear increase, nothing being reported from there in 1881.

The Tintic Mining and Milling Co. produced 59,814 ounces silver and 417 gold, a total value of \$76,230.75, to which the usual addition is to be made in reckoning the difference between values here and at the seaboard.

Other Districts.

The other districts, Bingham, Little Cottonwood, Big Cottonwood, Marysvalle, American Fork, Stockton, etc., are not separately stated, their product going in to swell the aggregate production of the smelters.

The following tables show Wells, Fargo & Co.'s statement of the mineral product of Utah for the year 1882:

BASE BULLION.	Pounds Lead Refined.	Pounds Lead Unrefined.	Ounces Silver.	Ounces Gold.
Frisco M & S Co.	3,027,424		214,320	882
Germania Lead Works	8,213,789	561,777	85,082	169
Hanauer	5,002,324	254,339	1,384	
Horn Silver M Co.	32,003,775	1,620,357		
Mingo Furnace Co.	10,128,738	316,309	816	
Other Smelters	966,600	58,606	13	
Total	8,213,789	64,200,98	2,648,073	3,264
Deduct base bullion purchased by Germania Lead Co.	713,885		44,968	124
Net product base bullion	8,213,789	51,576,668	2,490,005	3,140
Lead, silver and gold in ores shipped		773,197	15,464	193
Matte containing copper, 605,880 lbs.			67,320	1,683
Total, 605,880 lbs.	8,213,789	52,349,860	2,581,769	5,016
DORE BARS.				
Germania Lead Works			308,532	646
Ontario Silver Mining Co.			1,853,064	
Silver Reef District			921,879	
Tintic M & Co.			59,814	447
Other Mills and Placers			15,766	2,930
Total Dore Bars			2,853,665	4,022

RECAPITULATION.		
605,880 lbs. copper, at 12 1/2 cents per lb.	\$ 75,735	
8,213,789 lbs. refined lead, at 5 cents per lb.	410,690	
52,349,860 lbs. unrefined lead, at \$52 per ton.	1,361,096	
5,435,441 ozs. silver, at \$1.123 per oz.	6,114,874	
0.089 ozs. gold, at \$20 per oz.	180,750	
Total export value	\$8,148,175	

Computing the gold and silver at its mint valuation, and other metals at their value at the seaboard, it would increase the value of the product to \$10,312,902.

The following is a comparative statement showing the quantity of the silver and gold contained in base bullion produced in Utah:

Year.	Total ounces of gold produced.	Total ounces of silver produced.	Value of gold in base bullion.	Value of silver in base bullion.	Percent of total gold product.
1877	4,350,703	17,325	2,102,095	11,035.48	2-10 63-60
1878	4,357,328	15,040	2,103,339	10,165.48	3-10 67-61
1879	3,835,407	15,932	1,797,589	5,693.46	3-10 35-70
1880	3,783,666	8,621	1,403,810	2,475.37	1-10 35-80
1881	5,400,191	7,958	2,648,899	2,624.48	9-10 32-90
1882	5,435,441	9,080	2,581,769	5,016.47	3-10 55-60
Total	17,171,279	73,314	12,037,583	87,409.46	5-10 51-210

The following shows the quality of Utah's bullion:

Year.	Total value of precious metals, including gold and silver contained in base bullion.	Total value of gold bullion, including gold and silver contained in base bullion.	Percent of gold product.
1878	\$81,151,622	\$14,710,581	18-1-10
1879	76,349,561	19,254,394	25-6-10
1880	80,167,830	28,114,504	35
1881	84,664,417	30,253,430	36-8-10
Total	\$321,176,456	\$92,342,909	28-7-10

IDAHO.

Idaho Territory this year shows a total production of \$3,325,738, against \$2,334,474 in 1881. This is quite a gain, but not so much as was expected from the number of new mines opened and the new reclamation works started up. The only two incorporated mines which have levied assessments were the Pilgrim, \$14,000, and the Western Home, \$5,000. The Castle Creek Gold Mining Co., of Idaho, paid its first dividend of 3 cents per share, or \$3,000, last June. It paid the same amount in July, August and September, making four dividends this year, or \$12,000. Holyoke paid its first dividend of 2 cents per share, or \$4,000, in October. In November it paid 3 cents per share, or \$6,000, and in December 2 cents per share, or \$4,000. The Custer and Gold Hill have done well this year. Of course there are many other mines which have been profitable to their owners of which no public mention has been made.

The smelter at Challis, with one stack, shipped 38 carloads of bullion. The owners, the Omaha Smelting Co., also shipped five carloads of ore so rich that it was nearly equal to bullion. Besides they have shipped one carload of copper matte, and have stock on hand left over of a few thousand dollars in value, making a grand aggregate for the year, together with the light stock on hand, of \$425,000. This, for one inexpensive plant, is a little hard to beat.

In Warm Springs district (Ketchum) the operations of the season, according to the *Krysnoe*, resulted in general satisfaction both as to outputs and developments. Results in general have been very gratifying, and the future looms up fat and hopefully encouraging. The season started in late, but when once going the mills were alive with enterprise and activity, owners were developing, and prospectors were in search of the precious metals. Thousands of tons of ore were turned out and hundreds of new locations made. The records of the district show about 300 of the latter, and the Philadelphia Mining and Smelting Co.'s records show the following among other interesting facts:

Ores purchased	Pounds
Philadelphia Co.'s ores received	2,839,437
Total	4,269,350

This has not all been reduced, a good supply for a spring start being on hand, but sufficient was reduced to turn out nearly 2,000,000 lbs. of bullion of an average value of 250 ozs. silver per ton. The mines from which most of this ore was received, with amounts and average value silver, are as follows:

	Pounds.	Ozs. per ton silver.
Elkhorn	1,950,000	70
Erwin	600,000	60
Blackhawk	200,000	90
W. Fork	140,000	105
Black Horse	75,000	80
Isabella	65,000	105
Mountain Girl	21,000	65
Ontario Queen	13,000	75
Carle Leonard	8,500	100
Moonlight	7,400	265
Occidental	7,000	65
Back Bay	4,500	212
Paymaster	6,000	35

There are 56 mines from which shipments have been made to this smelter, a few of them in neighboring districts, but nearly all in our own. The Ontario shipped \$20,000 worth to one place out of the district, while many other mines have fine lots of ore on their dumps ready for sale or shipment, when markets and transportation facilities are more favorable, as they certainly will be.

Little Wood River mining district, which figures so prominently among the producing mineral sections, is situated near the center of Alturas county, and embraces an area of about twenty-five square miles. Little Wood runs parallel with Big Wood river, and is about twenty-five miles east of the latter stream. Muldoon, the town and supply depot, is situated near the head waters of the river, and twenty-five north of the crossing of the Blackfoot road, with which it is connected by a good wagon road. Shoshone, the junction of Wood river and the Oregon Short Line railroad, is distant about fifty miles, also approached by good wagon road. The great Muldoon group is the best developed among the mines. The owners of the Muldoon group mines also own and operate very fine smelting and sampling works under the title of Little Wood River Mining & Smelting Co. The works are three miles from the Muldoon mine. These works consist of a plant of two 40-ton smelting furnaces, with all the accompanying machinery, such as crushers, sampling works, etc., all of which are propelled by a 100-horse power steam engine. There are about 100 tons of bullion piled up at the smelter now. Among the mines near by are the Mountain Boy, Josephine, Jones & Davis, Gen. Garfield, Bonanza Boy, Buckhorn, Rose Abby, Iron Clad, James, Rippetto, Narrow Gauge, Hoodlum, Karriek group, Good Hope, Monitor, Lexington, etc.

The Yankee Fork region seems to have been prosperous this season. Although the camp has been in existence as a placer mining region of some note for seven or eight years, it is only since the purchase of the great Custer mine that it has been known to the general public as a large bullion-producing district, and just as its fame in that line began to spread, Wood River country loomed up, and in a measure overshadowed it. Placer mining on Jordan creek began in 1874-5, and had been in progress at and near the mouth of Yankee Fork of Salmon river for some years prior thereto; also at Loom creek, 18 miles north. The Charles Dickens mine is the "boss" lode of the region. The Dickens lode is now known as a great and continuous or mother vein, extensions having been discovered and located continuously for miles, among the more prominent of which are the Pilot, Paradise, Passover and George Washington. There are 6,000 tons of ore run on the Charles Dickens dumps.

One and a half miles north of the Dickens and across the canyon is the great Custer, which lies in direct line with the Dickens, and is undoubtedly a continuation thereof, the ore being similar in character. The Custer has a brief history, its fame as yet only maturing; discovered in 1878; traded for a butcher shop; almost abandoned; gradually attracting attention; then in the courts, and finally sold for about \$100,000 in 1879. A 20-stamp mill built in 1880 commenced operations in the spring of 1881, and the returns thereof in bricks of gold and silver bullion to date foot up in value to a most enormous sum of \$2,000,000, and that all from surface ore, the mine as yet being undeveloped underground; ten additional stamps are now being put into the mill.

The Salmon River mines include the great districts of Bay Horse, Poverty Flat, Squaw Creek, etc.

The Squaw creek mines are principally owned by J. D. Murphy & Co., a New York City firm, Capt. C. B. Rustin and Messrs. Conover & Gaunt. But little has been done the past season on any of the locations.

Situated near the head of East fork of the Salmon river are what is known as the Germania, Arctic, Idaho, Bible Back, Washington, Croesus, Tyrolense, etc. The Germania shipped from July 1st to Nov. 1st 86,000 lbs. of ore that averaged 180 ozs. per ton.

The mines in Yellow Jacket district, situated about 40 miles north of Challis, are principally gold producing, and report speaks favorably of them. The principal mine in this camp has been owned and worked by Dr. Van Horn, and has just been sold to San Francisco parties for the sum of \$30,000. The Bay Horse Mining & Smelting Co.'s smelter, situated on Bay Horse creek, has a capacity of about 20 tons. On the 15th of last June this furnace commenced work in earnest, and the result to the first of December, when the works were closed, there was 40 tons of bullion, valued at \$850 per ton or \$34,000.

The Salmon River Mining & Smelting Co.'s smelter, situated on the banks of the Salmon river, at Clayton, has a capacity of about 30 tons, but only run 20 days the past season. The bullion produced was of a good grade.

Blackhorn district is a new and important region just opening up, the great Tyndall lode being the chief.

Leesburg district in northern Idaho is fast becoming known as a region of great possibilities.

Sawtooth district is on the extreme northerly tributaries of the Shoshone Salmon, and separated from the Wood River country by a range of mountains, over which is a good wagon road. The distance from Vienna and Sawtooth to Galena, head of Wood river, is 15 miles; to Ketchum 40 miles; to Hailey 55 miles; to Bellevue 60 miles. The mines of Sawtooth district are divided into a number of belts. Those near Vienna are known as the Smiley Basin mines, and those in the vicinity of Sawtooth (seven miles north of Vienna) as the Beaver Canyon and Salt Creek belts.

Next year will make a very great difference with Idaho. There has been a great deal of preliminary work done in the Territory this year. New reduction works have been put up, new mines opened, and old ones put in shape for development. Capital has been attracted to the newer regions—and even the old ones, like Owyhee, Boise, etc., have experienced a revival. Next season Idaho ought to be ready to turn out a great deal of bullion. It has suffered badly from lack of means of transportation, but these will before long be supplied, and the mines can then be better worked. There is yet a great extent of unprospected territory in Idaho.

MONTANA.

Montana is credited last year with the production of \$8,004,000, while she produced only \$4,359,071 in 1881, and \$3,822,379 in 1880. Her progress is steady and rapid. The biggest camp in Montana is Butte, and she produced the most bullion. The *Inter-Mountain* of that place says:

A careful review of the mining, milling and smelting affairs of this camp can lead but to one conclusion, viz.: that the outlook for the mining interest of the Summit Valley district for the season of '83 is fully as high as the most sanguine friends of the camp expected, and far brighter than that of any other camp on the Pacific coast. Owing to the depression in Eastern mining circles, and to the fact that so many speculators in Colorado properties were outrageously swindled by the methods in vogue in that State, no little distrust as to the legitimacy of mining as a business has been infused into the

public mind, and really meritorious camps, great and permanent producers like Butte, have been condemned as being unworthy of confidence as the veriest wild-cat, knife-blade district in the country. Thus it is that the city of Butte has not this fall enjoyed the bustle and excitement of a big boom, which, in the minds of some mistaken persons, is the only evidence that a camp has rich and productive mines. That the boom did not strike Butte is extremely fortunate, but if anyone thinks that because this district is not now the scene of extravagant flush times and crazy mining speculation the mines have shown the slightest deterioration, never was he more grievously in error. The fact is, that Butte to-day is shipping more bullion and matte than ever before. The mines are being worked to the deep, and solely on their merits. The ore in sight at present is twice as great in amount and fully as rich as one year ago. Our silver properties show constant improvement, and the copper mines have developed truly wonderful productive capacity since December, 1881, when the copper interest was looked upon as comparatively unimportant.

The Aliee, Lexington, Moulton, Silver Bow all have the latest improved hoisting machinery in operation, most of it having a power capable of sinking to the depth of 1,000 feet. The aggregate number of stamps represented is 210. But productive and lasting as the silver mines undoubtedly are, they are likely to find formidable rivals in the copper properties now being opened up. The Colusa for the past two years has produced from 50 to 100 tons of ore per diem, much of which has been shipped in a crude state, the remainder being smelted in the magnificent works which are now turning out on an average 18 tons of copper matte each day. The Parrot company is putting up new and heavy machinery, and expect to tax its power to the utmost in hoisting the immense quantities of ore now available for extraction in the Parrot mine. The 50-ton smelter is easily kept supplied. A competent authority states that the Parrot could now produce 150 tons per diem of first-class ore if desirable. The Ramsdell Parrot and Shakespeare Parrot are also heavy producers, either of which could supply a 50-ton smelter with plenty of work. The Boston and Montana Company are working four mines, and the smelter is turning out copper matte at the rate of \$1,000,000 per annum.

In the Butte *Inter-Mountain* of the 13th we find the following: Owing to the fact that some of our mining and milling companies have not before completed a statement of their work for the year just closed, it has been impossible for the *Inter-Mountain* to present to its readers a correct and authorized tabulated statement of the year's production of silver, copper and gold in this district. Even now it is impossible to collect all the statistical details of the product, but the following figures, as far as completed, are correct:

Aliee Co. assay.....	\$ 850,000
Moulton Company.....	406,92
Silver Bow Company.....	48,473
Lexington Company—this month run.....	340,100
Dexter Mill—Anaconda Company.....	100, 00
Colorado and Montana Company.....	865,000
Montana Copper Company—matte.....	1,4 8,000
Montana Copper Company—ore.....	12, 40
Bel Company—January to June.....	324 00
Parrot Company.....	1,75,000
Longmead Concentrator.....	12, 000
Total.....	\$6,831,793

These figures are somewhat startling, but they are nevertheless true, and within a few days such additions will be made to the table by statistics not now obtainable of crude ore shipments, that the grand total will be swelled to \$7,000,000.

The following table, showing the value of gold and silver bullion deposited at the United States Assay Office at Helena during the year 1882, is published by the *Helena Herald*. In the item of gold deposited and treated the amount has increased yearly since 1877, the present annual showing being nearly double of that six years ago, and exceeding that of 1881 by upwards of \$100,000. The slight falling off in the silver deposits is owing to the increase of shipments direct from contiguous mines to the East, being a saving to the companies in the item of freights. The bulk of silver bullion produced in the Helena district is transported to market in its crude form, and of course does not appear in the assay office figures:

Months.....	Gold.....	Silver.....
January.....	\$32,669.93	\$ 4,063.07
February.....	60,622.81	12,665.95
March.....	21,984.63	14,194.12
April.....	53,523.69	15,765.50
May.....	50,701.94	12,222.20
June.....	72,723.69	15,532.93
July.....	80,173.89	3,597.97
August.....	62,676.58	1,414.79
September.....	73,594.31	1,700.97
October.....	73,453.54	2,772.12
November.....	61,394.32	1,830.54
Dec., estimated.....	16,000.00	4,000.00
Total 1882.....	\$678,925.33	\$91,013.16
Total 1881.....	\$70,536.63	\$8,714.04
Increase.....	\$108,388.70	\$7,700.88

TEXAS.

This is the first year that Texas was ever mentioned in the bullion tables, and it is credited with a yield of \$257,597 in silver. The most abundant metallic product of the State is copper. The copper belt extends from the Red river and the counties of Clay, Archer, Wichita, Haskell, etc., across the Rio Grande, through the counties of Pecos and Presidio, and yields, in immense quantities, an ore which will smelt on an average 55% of pure copper. In the immediate vicinity are found timber and fluxes, Argenteiferous galena is found in northwestern Texas. Manganese, cobalt, nickel and bismuth are also found. Iron occurs in the same region as copper. There are also large coal fields.

OREGON.

We have from week to week given the current news from the Oregon mines, but, compared with the work done elsewhere, the State makes a small showing in mining. The mines are principally surface diggings, comparatively few quartz mines being worked. The product has been entirely of gold. We are unable to obtain statistics from all over the State, but of Grant county the *News* has gathered a good deal of information and apparently reliable figures: A little more than 20 years ago the gold mines of Grant county were discovered by chance. A company of men from northern California who were on their way to the then famous mines of Salmon river, Idaho, camped for the night on Pine creek, and some of their number found gold on the creek and staid to prospect more thoroughly. A little investigation convinced them that the mines of the vicinity were very rich, and in a short time Canyon creek was alive with men. The importance of this discovery to Grant county and to eastern Oregon can hardly be estimated. At the date of the discovery this county was a howling wilderness, roamed by the fierce Umatilla and crafty Snake Indian. Now it is the home of miners, farmers and stockmen.

For twenty years a stream of gold has been steadily pouring out of the county. The total output for these twenty years has been enormous, yet all attempts at estimating the amount are guesswork. Of late years much of the mining has been done by Chinese, who are very reticent concerning their operations. The placer mines of Canyon creek were among the first to be worked, and have yielded more of the precious metal than any other creek in Oregon. At one time there were 5,000 men at work on the creek, and wages were very high then, so that the yield must have been large to pay expenses. The creek bottom, from hill to hill, as well as parts of the "rim," has been worked for six or seven miles. At present the principal work is being done by Chinese, near the mouth of the creek. There are probably 150 mining on the creek yet. It is impossible to tell how much gold they have taken out during the year, but is estimated at \$100,000.

The history of Dixie Creek is similar to that of Canyon Creek. It has been worked in the same way and has yielded largely. A Chinese merchant stated some time ago that he had handled \$400,000 that was taken out by his countrymen. At present there are about 35 Chinese at work upon the creek, near Prairie City. It is estimated that they have taken out at least \$25,000 during the year. The quartz mines near the head of the creek have attracted much attention during the year, although most of the work done has been applied in prospecting and testing the various lodes. Three arastras have been at work during the season. Every ton of quartz that has been crushed during the year has paid over \$20 to the ton; some of it as high as \$75 to the ton. Ore has been crushed from 5 lodes and work has been done upon 13 during the year. Most of the rock ground has been taken from Starr & Settlemier's ledges. Yield of quartz mines during the year, between \$11,000 and \$12,000. Number of men engaged in quartz mining, 16. Number of claims filed for record, 33.

On Granite creek the famous Monumental mine, with its splendid mill, is lying idle, but there is said to be reason to believe that it will be started up before long. Work is being done upon 20 mines, although little or no rock was crushed during the year. Ore has been worked from 18 mines in the district at various times. During the year 27 quartz mines were recorded from this district; part of them are on Onion creek. Placer mining has been more active on the creek during the year. There are about 140 men engaged in mining there, 30 of whom are white men and the rest Chinese. The Chinese are exclusively engaged in placer mining; the white men largely so. Sixteen hydraulics were operated during the season, and are estimated to have yielded \$30,000. All other mines, \$35,000.

The mines at Marysville are not situated on a creek, like most placer mines, but consist of a rolling bench at the foot of a mountain. Several acres of surface have been washed off and paid well. Including Pine creek and Quartz gulch close by, there are some 15 white men and 12 Chinese engaged in placer mining. Five hydraulics are operated, employing 10 or 12 men. Estimated yield of hydraulics, \$10,000. Other placer mines, \$3,000.

On Olive creek considerable prospecting for quartz has been done. Eight claims were recorded during the year. Three hydraulics were operated during the summer and took out about \$5,000. There are about 15 white men and 20 Chinese engaged in mining on the creek and in that vicinity. Estimated yield for the year, \$13,000.

Spanish gulch is situated near the western edge of the county, and appears to be outside of the regular mineral belt, which extends through the county from southwest to northeast. Like all the placer mines of the county, it has seen its best days. At present there are three hydraulics operated there during the season, giving employment to seven white men. The yield for the year is placed at \$3,000.

On Elk creek 30 or 40 Chinese took out \$10,000, and a few white men \$5,000.

The number of men engaged in mining in Grant county during 1882 was as follows:

Canyon Creek.....	165
Granite.....	140
Dixie.....	60
Olive.....	35
Marysville.....	27

Elk.....	40
Miscellaneous.....	25

Total.....497

Number of quartz veins located and recorded in the office of the County Clerk during 1882: Gold and Silver—Granite Creek district, 27; Elk Creek, 8; Olive Creek, 8; Dixie Creek, 33; Canyon Creek, 1; Quinn River, 6. Total, 83.

Copper—Dixie Creek, 1. Cinnabar—Birch Creek, 2; Riley Creek, 1. Total, 3.

Placer claims recorded during the year—Granite, 2; Olive, 2; Elk, 4; Canyon, 5. Total, 13.

One ledge of marble has been located on the South Fork.

Yield of Grant county mines during the year 1882:

Canyon Creek.....	\$110,000
Granite.....	65,000
Dixie.....	42,000
Olive.....	19,000
Elk.....	15,000
Marysville.....	13,000
Spanish Gulch.....	3,000
Miscellaneous.....	10,100
Total.....	\$271,000

WYOMING.

Although Wyoming does not figure in the table of bullion production of the United States, there are mines there, and some parts of it are said to be exceedingly rich in gold and silver. Mention should be made of the once abandoned but now again prosperous mining country known as South Pass, Atlantic and Miner's Delight, lying to the east and south of Wind river range of mountains, and about equidistant from Green river station on the U. P. R. R. and old Fort Washake to the east of Wind river and in the Wind River valley.

Miner's Delight mining district, the oldest mining camp on the hill, was discovered in 1876, and was for a long time worked more for its placers than for quartz. It is situated on the west and north of Beaver creek, and extends to Atlantic gulch and Fort Stambough on the west, to the Sweetwater river on the south and east, and includes in its territory what were in former times good placer diggings known as the Strawberry mines; also some very valuable quartz mines to the north of Stambough, among which may be mentioned the Miner's Delight mine, named for the district, the Young America, Mozart, Peabody, Hidden Hand and many others of minor note.

Probably no mining district in Wyoming has a greater number of locations, or a greater amount of work done on them than has Atlantic district. A sanguine correspondent asserts that within a year, or even less, this district will witness a boom not unlike Leadville or even Wood River. All the mines in this district are at an altitude of from 8,000 to 9,000 feet, and all of them also show ore in greater or less quantities. Here are the Buckeye, Cariboo, Old Dominion, Sorelle and Perkins, Red Jacket, Duncan and others.

The South Pass district, adjoining Atlantic on the west, are the Washington, Hope, Doc, Blair, Carissa, Young America, Carrie Shields and a host of others, all good properties lying idle for lack of funds with which to develop them. The same correspondent to whom we refer says: "All that is wanted to make this a second Comstock mining country is capital in the hands of parties who will use it judiciously, and I trust that in less than a year men of capital will become mindful of the fact that a mining country with the facilities this section has should not remain idle."

DAKOTA, ALASKA AND MEXICO.

This year Dakota yielded \$2,855,127, while in the previous year it yielded \$3,550,950. Dakota has been producing for the past six years. So far the productive mines consist of the little group at Black Hills. Recently most of these properties have passed under the same control, and this probably accounts for the falling off in the production in the past two years. The yield of Dakota was the largest in 1880, when the total was \$4,123,000.

Alaska does not ent much of a figure in the table of bullion product, yet she has several good mines about Harrisburg and that region. Other mining regions are being opened also. The recent announcements of discoveries on the headwaters of the Yukon river may possibly attract in the spring a crowd of prospectors who will thoroughly search the country about the new find. The season is so short in Alaska that the mining development of the country will be comparatively slow.

A good deal of attention is now being paid to mines in Mexico by Americans, but mining there is attended with many difficulties not experienced in more enlightened countries. Still its mines are attracting many persons, especially into those parts of Mexico where the railroads will run.

Lower California mines have never been profitable, and comparatively little mining is done there. There is an extensive copper belt in the country, however, which will no doubt before long be taken hold of and developed.

SENATOR ARTHUR GORMAN, of Maryland, presided over the United States Senate during the temporary absence of Vice-President Davis. Less than 20 years ago Gorman was a page in the Senate.

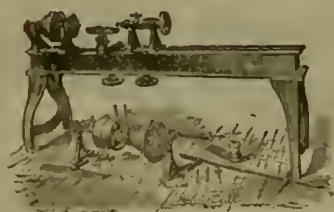
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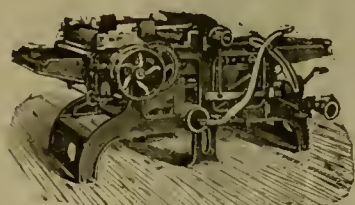
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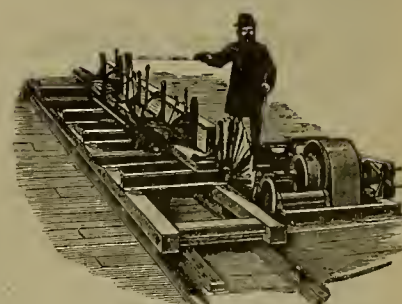
Panel Raiser.



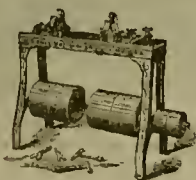
Surfacing Machine.



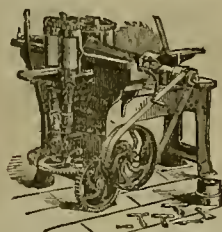
Portable Engine.



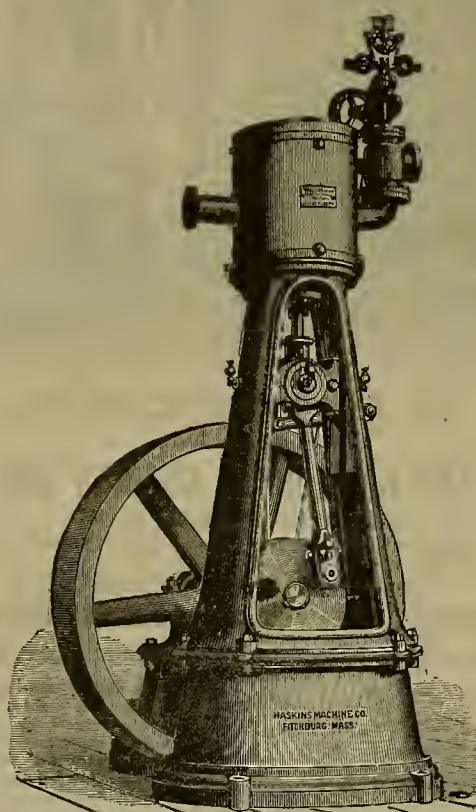
Pony Saw Mill.



Blind Slat Tenoning Machine.



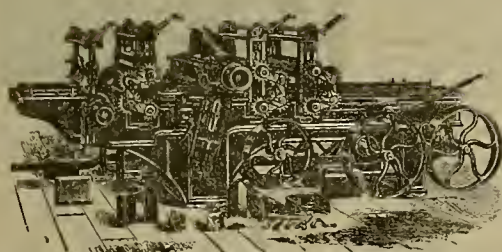
Resawing Machine.



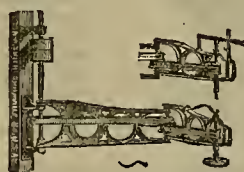
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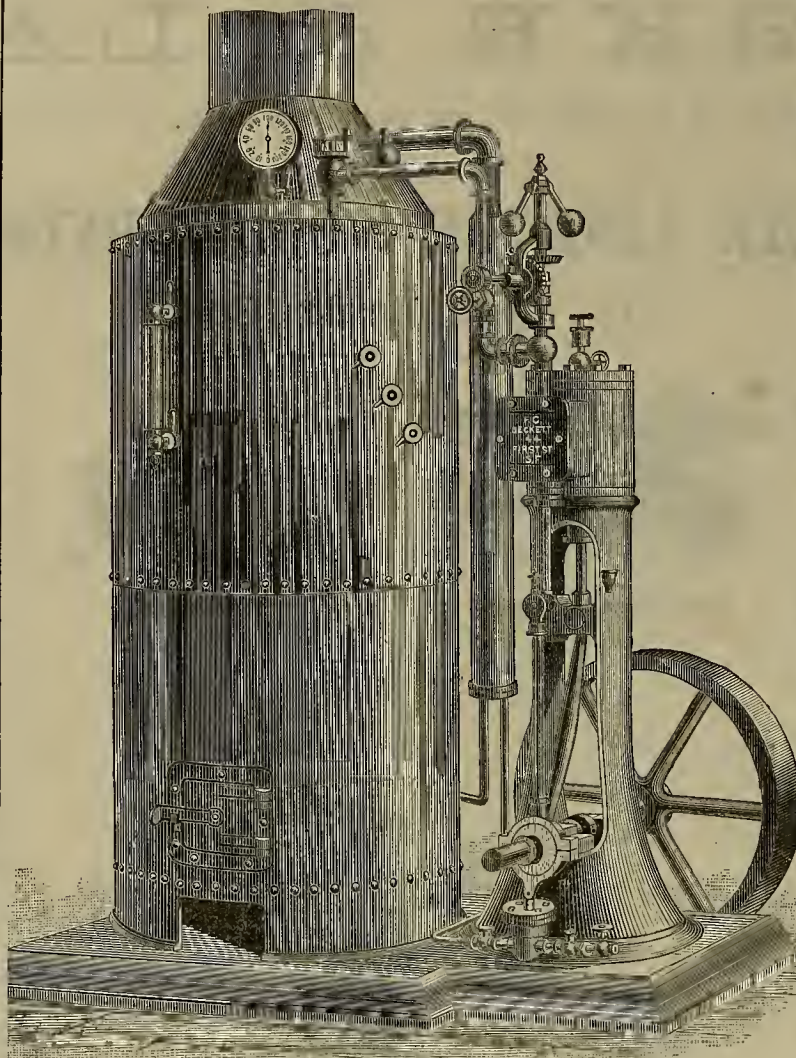
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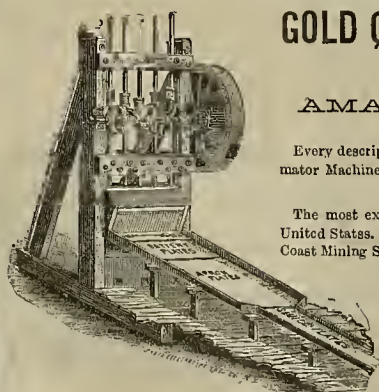


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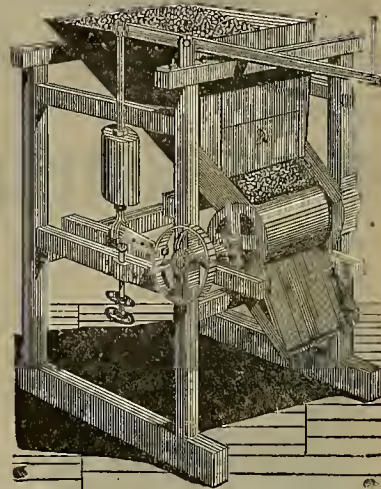
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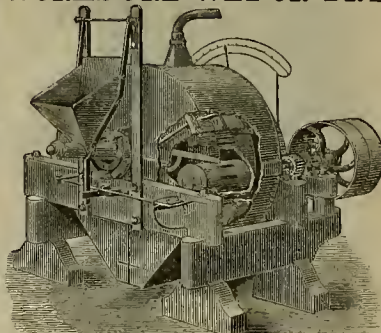
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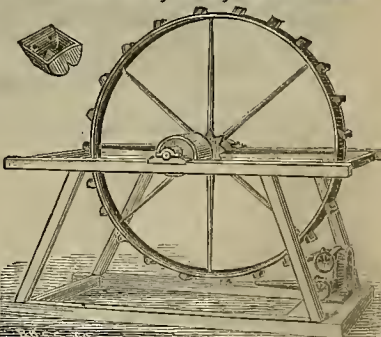
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Of Interest to Miners.

During the next few months we intend giving to the readers of the MINING AND SCIENTIFIC PRESS a series of valuable illustrated articles of special value. Among these may be mentioned a series of articles now in course of preparation on "Timbering in Mines," which will be very freely illustrated. This will give the methods in vogue on this coast, as well as those commonly practiced elsewhere. A series of articles is also being prepared on "Blasting in Mines," which will also be illustrated. This will be of great practical interest, containing, as it will, many details of every-day use to the miners. It will treat of the various methods of preparing blast holes, blasts, etc., the tools used, the explosive agents and kindred subjects.

In addition to these articles, which will be continued through several numbers of the PRESS, we are preparing a special mining map of British Columbia, with a description of the geology of the region and of the mining districts.

A map of the mining districts of Alaska will also be given, showing the location of the quartz mines now being worked. It will also show the course of the Yukon river, where the recent finds of placer mines were made, and where it is expected some rich developments will be made next season.

We have, too, in course of preparation a map of some of the Montana districts, and one also of the various mining districts of southwestern Nevada, along the line of the Carson and Colorado railroad.

It is intended to more fully illustrate the PRESS than heretofore, and with appropriate engravings. Such of the mechanical appliances of mining or metallurgy as may be practical in their nature we propose to illustrate and describe from time to time as occasion offers.

It is the aim of the publishers of this journal to keep pace with the progress of the mining industry. The mountains of the whole western side of the continent are now hunted over by the adventurous prospectors. New mines are being found every day, and new works are being put up. The MINING AND SCIENTIFIC PRESS has kept track of this business for 20 years, and been with it in its ups and downs. Its best efforts have always been with the prospector and working miner, and will continue to be so.

It has been our object to cull from every source such things as would be of practical value or interest to the class of readers with whom we are identified, and these efforts have been appreciated, we trust.

The PRESS has the satisfaction of knowing that its columns have never been lent to bolster up any scheme to fleece unwary stockholders, and that it has persistently upheld legitimate mining. Now that legitimate mining is in the ascendant, we feel that we have done our share in the good work.

We can of course do nothing without the co-operation of the mining community. While already possessing among our subscribers a large proportion of the progressive miners of the coast, there are new men in the business who may not be familiar with the merits of this journal. To these others familiar should present its advantages and call their attention to the desirability of becoming subscribers. It will be a mutual advantage. The more full our patronage the better paper we can make. We trust these words will not fall unheeded, but that they will result in material addition to our lists. We feel no hesitation in presenting our claims, feeling as we do that it is but justice to ourselves to call attention to them occasionally.

ABOUT MINING LOCATIONS.—A question which has perplexed locators of mining claims for some time, and on which there has been a difference of opinion among claim owners, has been settled by the United States Land Commissioner at Washington. The question asked was this: "Is a location made on a quartz lode or ledge on the first day of January, 1882, subject to relocation on the first day of January, 1883, provided the required assessment work has not been done for the calendar year of 1882?" To which Commissioner McFarland replied: "It is not. The locator of a claim initiated on the first day of January, 1882, has until January 1, 1884, to complete the first assessment work; which work when done would hold the claim until January 1, 1885."

GUSTAVE DORE, the famous French painter and designer, is dead. Dore caught cold Friday when returning home from a source. On Saturday inflammation of the throat set in, and despite every effort it was impossible to arrest its progress, and he expired at 1:30 p. m.

Alluvial Gold in California.

The State Mineralogist has arranged on a series of microscopic slides the various forms of gold as collected in hydraulic, placer and drift mines in California, with associate minerals found in "cleaning up" the sluices. These forms of gold are very curious, some of them, and of great interest to the miner. The slides are arranged to serve as objects to illustrate the description in the report of the State Mining Bureau.

One slide showed gold crystals after stibnite (?) from the Lake mine, Napa county, California. Several pans of dirt were taken from the gulch, washed down in a miner's pan to a small quantity, a portion of the mercury added, the mercury separated without rubbing and boiled in nitric acid, these pseudomorphic crystals remained. An attempt was made to produce similar crystals by treating precipitated gold in the same manner, but without success.

The gold from the Beveridge mine, Inyo county, was shown as having been rolled into cylinders under the smelter while being crushed.

The placer gold from upper San Joaquin river, Fresno county, California, is fine and free from coating, except to a slight degree on some of the pieces. It shows a tendency to crystallize.

Placer gold from San Luis Obispo county was shown very pure and free from coating.

Placer gold from the shores of Mono lake, Mono county, California, is remarkably pure and free from coating. It amalgamates perfectly and immediately on being brought in contact with mercury.

Placer gold from Chile gulch, Calaveras county, is in a cryptocrystalline state not easy to account for. Many of the grains inclose quartz, which would seem to indicate that it has its origin in some quartz vein in the immediate vicinity. It differs from ordinary placer gold, and may have been collected by mercury and overheated in the retort.

The electron we have already referred to in previous numbers of the MINING AND SCIENTIFIC PRESS.

Another piece is a typical specimen of coated or "rusty" gold, Red Hill hydraulic mine, Butte county. All attempts to collect such gold by amalgamation results in failure; for this reason a large proportion of the placer gold, and especially that from the ancient river beds, is lost to the world. The loss is so great, and the matter so serious, that miners, inventors and scientific men should attempt to devise some plan by which such gold may be saved.

Another piece is rusty or coated gold from a large deposit of tailings below Oroville, Butte county. The particles of gold are not in the same extent coated, but that all are more or less so.

The placer gold from the Bonanza hydraulic mine, Gold Run, Placer county, is considerably coated. This gold was collected in "crevicing."

One specimen of placer gold was shown coated with silica by pressure and friction, from the Blue Lead bedrock, below the gravel, Chalk Bluffs, Nevada county.

Coated placer gold, with pyrite and magnetite, from Nevada county, is among the specimens.

Another is a piece of hydraulic gold, amalgamated and boiled in nitric acid, by which the mercury was dissolved. The product is beautifully crystallized. The gold used was amorphous.

One piece showed gold precipitated from solution of sesquichloride by solution of protosulphate of iron.

One slide showed precipitated gold amalgamated and boiled in nitric acid.

Gold from the Spring Valley hydraulic mines Butte county, was in the form of amalgam, from which the mercury was volatilized by heating to redness in a porcelain capsule.

Concentrations from the Spring Valley hydraulic mine, Cherokee Flat, Butte Co., show platinum and iridium.

Concentrations from placer washings, Chiquita Joaquin, Fresno county, contain zircons with gold; curious as showing gold in two conditions—as pure gold or nearly so, and as electrum, a natural alloy of gold and silver.

Gen sand (so-called), from Lower Gold Bluffs, Humboldt county, contains gold, platinum, magnetite, chromite, quartz, zircons and red crystals. It is the result of natural concentration by the action of the waves on the ocean beach.

Concentrations from the Spring Valley hydraulic mine contain zircons.

Sands concentrated from placer mines, in Amador county, contain zircons.

In the dime sands of San Francisco, all, or nearly all, of the grains are rounded. In this deposit, which is quite extensive near the city of San Francisco, there are beds of iron sands in varying states of decomposition, showing how some sand stones are mottled and become shaded in process of induration.

In the fine sand from the Colorado desert, San Diego county, the grains are rounded by the action of both water and wind.

In specimens from the fine sand from the Spring Valley hydraulic mine all the grains are angular.

Fine quartz sand from the Polar Star hydraulic mine, Dutch Flat, Placer county, shows all the grains to be sharp and angular.

Another microscopic slide showed placer gold with globular pyrite in the form of sand from Last Chance mining district, Placer county. This gold is but slightly coated. The small concavities are in some cases coated with silica, and some grains show the pyrite attached. The gold is remarkably fine, probably the most so of any in the State, being .996 fine. The pyrite sand is very interesting when examined microscopically. This association is rather rare. The exact locality is Section 34, township 15 north, range 12 east, Mount Diablo meridian.

Miner's Combination Tool.

John Jones, of Oregon city, Oregon, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a combination tool for the use of miners in their operations with blasting fuse. For handling fuse in preparing it for a blast an ordinary pen-knife does not answer the purpose well. This invention is intended to provide a tool to split the fuse either lengthwise or crosswise, to cut it off squarely from the coil, to press its end to receive the cap, and, finally, to press the cap tightly upon it. The tool is in shape somewhat like a pair of pliers, the points or jaws of which are formed, one flat and the other into a blade, constituting the splitting mechanism, and the flat jaw having upon its rear part a small projection formed into a cutting edge, which, with that portion of the blade which meets it, constitutes the cutter. Behind the pivot-point the meeting handles are formed with grooves adapted to fit around and press the end of the fuse, and also with other grooves having ribs adapted to fit around the cap and press it tightly upon the fuse when fitted upon it.

Blasting fuse is ordinarily a tube filled with some combustible material. In order to get at this composition to apply the match so that it will readily ignite, the protecting tube is split lengthwise at one end. Sometimes, where no blasting cap is employed and the explosion is effected by direct contact with fire, it is necessary to split or cut the sides of the tube crosswise, so that the fire when it reaches these cuts may issue forth to produce the explosion. One side of the plier has its point or edge made flat upon its inner surface, while the other side has its edge made in the shape of a blade, the cutting edge of which is adapted to be brought down upon the flat surface of the other jaw. By this construction the fuse may be split or laid open, and may be cut crosswise without entirely cutting through it. Upon the flat jaw near its rear part is a projecting jaw, which is ground to a cutting edge, and forms, with the blade of another jaw, a short cutter. In this the fuse may be easily severed from the coil or cut into desired lengths. Behind the pivot-point on the inner side of the two handles, which are of some width, are cut grooves, which, when the handles meet, form a hole or die. In these grooves are formed ribs or beads. When the cap is fitted upon the end of the fuse it requires to be pressed tightly, making it secure and water-tight, so that it will not be damaged when used in wet holes. The handles are opened and the cap fitted in the grooves, which are then brought together and pressed tightly around it. The heads press into it and form encircling dents which hold it securely to the fuse. Behind the grooves are others, smaller, which are made to fit over the end of the fuse and by compressing it prepare it to receive the cap with ease.

The annual meeting of the American Institute of Mining Engineers will be held in Boston, beginning February 20, 1883. Volume X of the transaction will soon be distributed.

Mining Notes from Nevada.

L. N. Murry, a well-known Comstock miner, came in from Nevada this week. He reports mining operations on the Comstock as at nearly a standstill. But few men are employed at any of the mines, and the prospects look very gloomy. Selling out and leaving is the order of the day in Virginia City and Gold Hill. The "Northern Belle" mines, in Esmeralda county, show some activity, there being 85 men employed in and around the mines; some very good ore is being taken out; the lower levels show fine veins of medium grade ore. Some very rich prospects have been struck in various parts of the country, but it is hard to get capital to take a hand and help develop new mines, as they have been so often out of pocket by such operations. In Garfield district, near by, several mines have been partially opened, which, in nearly every instance, show good pay ore, and sufficient is produced to keep two custom mills running day and night. A company has been formed, which will at once commence the erection of another mill. About 200 miners find employment in the district, working either on shares or by the day.

The "Alexandria" mines, at Grantsville, Nye county, Nev., are doing but little, although there are vast quantities of low-grade ore in sight, but the high price of fuel and the low price of the bullion produced at these mines keep the company from pushing their mining operations.

The Manhattan Mining Company, at Austin, Lander county, are making about their usual monthly shipments. They are not increasing their force of miners, however, owing to the low price at which their bullion is sold in the market. Mr. Murry is of the opinion that the Garfield is the most promising district in the State, and proposes to erect a custom mill at that point in the spring.

News in Brief.

It is authoritatively stated that the Prince of Wales and suite will visit Canada the first week in March, remaining until after the meeting of the Science Association.

About 40 lives were lost by the explosion at the Giant Powder works, near West Berkeley, on Sunday.

TRAIN robbers on the C. P. R. R. were foiled by the bravery of the express messenger Ross, who kept them at bay until time for another train to arrive, when they rode off, robbing only the train men.

A woman, laboring under religious insanity, in Milwaukee, killed her three children, oldest seven and the youngest 18 months, in the most brutal manner, literally cutting them to pieces and completely disemboweling them. She took her arrest very calmly, stating she had read in the Good Book that it was her duty to sacrifice her children.

THE CARTWRIGHT MINE.—Doak & Auderson, proprietors of the Champion lode, in Fresno county, have their new 10-stamp mill running on custom rock at present, but will soon start it on their own rock, of which they have quite a lot on the dump, and enough good paying ore in sight to keep the mill running for six months. They have three of Hendy's concentrators in use. All the machinery works to a charm.

Does Advertising Pay?

The Portsmouth (Virginia) Times says: It is sometimes questioned by merchants whether advertising pays. The question will hardly bear discussion in the light of the following facts, rates for transient advertisements being figured: "The Chicago Tribune," it is said, for a column a year receives \$26,000. The New York Herald receives for its lowest-priced column \$39,723 and for its highest \$349,000. The New York Tribune for its lowest \$29,764 and for its highest \$95,648—and these papers are never at a loss for advertisements to fill their columns. Their patronage comes not from any desire to assist the respective parties, but from business men who find it profitable to advertise."

A firm of manufacturers in Philadelphia placed an advertisement in a journal as an experiment. As they were economical Quakers, they commenced sparingly. Within three months their advertisements were running in seven different publications, and there is no question with them about its paying. As well might an enterprising firm try to save postage as the cost of advertising. Customers go to those who most persistently extend them an invitation. Judicious advertising pays a hundred fold.—Exchange.

Recent Contributions to the California State Mining Bureau.

(Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANES, State Mineralogist.)

[CATALOGUE.]

- 4457. Bird's Feather coated with carbonate of lime—Formation springs, Idaho. See 4468. Peter Decker.
- 4468. Alum Incrustation—Found 10 miles north of Santa Rosa, Sonoma county, Cal. C. W. Frost.
- 4469. Limonite—Near Murphys, Calaveras county, Cal. E. H. Schaffle.
- 4470. Chromite—Near Murphys, Calaveras county, Cal. E. H. Schaffle.
- 4471. White Lava, so called, indurated volcanic ash—Near Murphys, Calaveras county, Cal. E. H. Schaffle.
- 4472. Selenite—Near Murphys, Calaveras county, Cal. E. H. Schaffle.
- 4473. Sedimentary deposit found in digging a well at a depth of 76 ft. near Roseville station, Placer county, Cal.
- 4474. Copper ore, principally chalcopryite—Section 12-13, township 15 north, range 6 east, Placer county, Cal. E. W. Roberts.
- 4475. Root, resembling an owl's head—Found on the beach, San Francisco bay, near Marin. J. Z. Davis.
- 4476. Silver ore showing wire silver—Belle of Butte mine, Butte, Montana.
- 4477. Crude Ozocerite—Southern Utah. J. R. Scoupham,

Esmeralda Coal Fields.

Some ten years ago, while prospecting for mineral bearing quartz, in the vicinity of what is known as the Washington district, croppings of coal were found which promised to develop into something of importance. Samples were in Aurora, and although they were considered valuable, but little was done toward a further development. E. C. Smith, who has taken a great interest in the matter, recently visited Carson, and informs the *Index* that the deposit is about ten miles southeast of Pine Grove, in Esmeralda county. It promises to prove quite extensive, and will furnish fuel for all of Mason valley without any trouble. The coal has been tested in ordinary coal stoves, and proves very nearly equal to the Rocky mountain article. It burns readily and leaves comparatively little residuum. The stratum already penetrated by a shaft of forty feet is fifteen feet in thickness, and the coal is easily mined. If this coal discovery is properly developed it will greatly reduce the expense of fuel in Mason valley. Wood is rapidly becoming scarce and dear. In some places in the valley it is necessary to go twenty-five miles or more to the mountains for wood, while the coal can be delivered in all parts of the valley at a freight charge of not much, if any, over five dollars per ton. Mr. Smith is the owner of this property, and looks forward toward realizing a handsome profit therefrom in the near future. We are glad to congratulate him and the people of Mason valley over this luckily found deposit of good fuel. The mine is about twenty miles from Pizen Switch.—*Esmeralda Herald*.

The London *Times*, on the burning of the Newhall house, at Milwaukee, says: It is a reproach and shame to modern intelligence that nearly a hundred lives were lost, in sight of a crowd eager to aid, from want of effective mechanical appliances.

The California representatives are very much annoyed at the action of the Ways and Means Committee in refusing them a hearing on the questions in relation to the tariff of interest to their section of the country. They promise to make a fight for their interests when the bill comes up in the House.

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That BROWN'S IRON BITTERS will cure the worst case of dyspepsia.

Will insure a hearty appetite and increased digestion.

Cures general debility, and gives a new lease of life.

Dispels nervous depression and low spirits.

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Strengthens the muscles and nerves, enriches the blood.

Overcomes weakness, wakefulness, and lack of energy.

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Will infuse with new life the weakest invalid.

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BROWN'S IRON BITTERS will have a better tonic effect upon any one who needs "bracing up," than any medicine made.

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Ores Worked by any Process.
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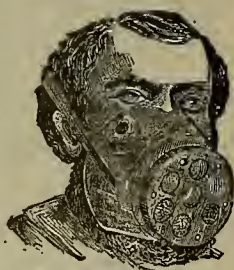


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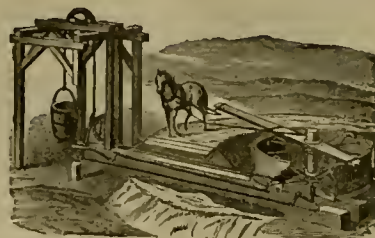
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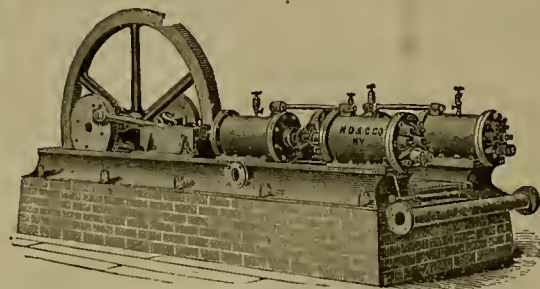
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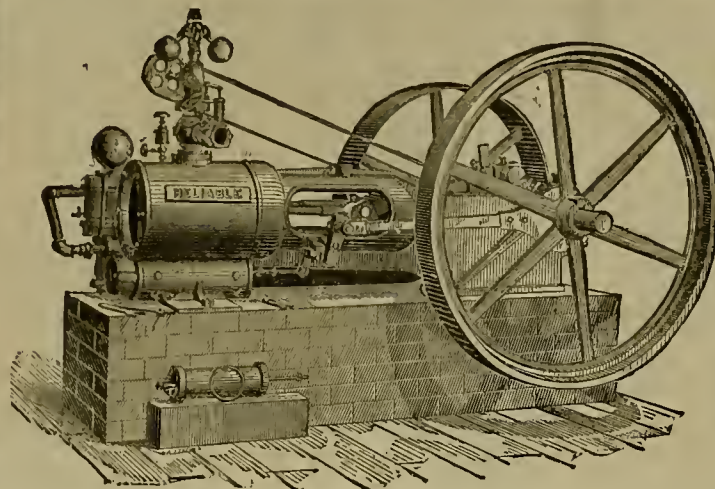
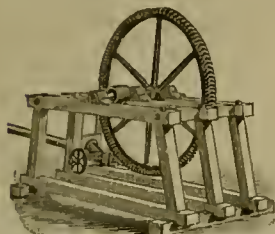
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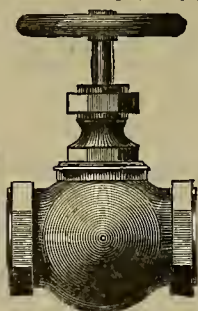
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NO. 1.—The most Powerful Explosive Compound now in use here.
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This explosive is from 50% to 60% stronger than the strongest Nitro-Glycerine Compound and impervious to water. Even hot water does not diminish its strength. We are now introducing the same.

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List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

WEEK ENDING JAN. 16, 1883.

- 270,876.—SEWER OR STENCH TRAP—L. D. Craig, S. F.
270,766.—COOKING STOVE—Chas. H. Dunton, S. F.
270,652.—TELEGRAPH KEY—W. D. Farren, Boise City, I. T.
270,655.—NASAL RESPIRATOR—W. A. Fruhling, Jr., San Jose, Cal.
270,671.—OPERATING PUMPS IN DEEP WELLS AND MINES—J. H. Huffer, Jacksonville, Or.
270,814.—SEWING MACHINE—Ed. Kohler, Oakland, Cal.
270,689.—MINING CAR—Gustav Olsen, S. F.
270,840.—LIGHTING DEVICE FOR LAMPS—A. H. Schluter, S. F.
270,704.—MOLD FOR MAKING CEMENT PIPES—N. W. Stowell, Los Angeles, Cal.
270,664.—REVOLVING SPRINKLER—Henderson & Schultz, Sierra Buttes, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

FEATHERING PADDLE WHEEL.—Chas. Megow, San Francisco, California, assignor of one-half to John L. Markel, of same place. No. 269,948. Dated January 2, 1883. This invention relates to a new and useful propeller wheel; and it consists in centrally-mounted revolving wheel, having around its outer circumference a number of swinging blades or fans having peculiar stems engaging with sliding frames set in the wheel. The wheel is mounted in a hollow casing, having a portion of its bottom cut away to permit the blades of the wheel to emerge therefrom and be exposed for a short distance. The inner surfaces of the casings have grooves in which pins or studs on the sliding frames travel, and these grooves are so made that by means of certain switching devices, the pins are deflected from one groove to another to lower and elevate the frames, whereby the blades are turned at right angles with the wheel just after they emerge from the casing, and are again turned in line with the wheel before they re-enter the casing. The object of this invention is to provide an effective propeller wheel, which may with advantage be applied to steam vessels, to which, on account of its simplicity, durability and effectiveness, it is peculiarly adapted.

MINER'S CANDLESTICK.—John Jones, of Oregon City, Or. No. 270,316. Dated January 9, 1883. This invention relates to a novel candlestick or holder specially adapted for the use of miners; and it consists of a prod or point pivoted or hinged in the end of a safeguard, and secured in position either in line or at right angles with said guard by a swinging clasp. The prod is pivoted with a hook near its point, and a spring-rig for the candle is secured to the device. The object of the invention is to provide a candlestick or holder, which, when not in use, may be carried in the pocket, and when in use, may be readily inserted in any convenient timber, or hung from a projecting point, and is therefore particularly adapted for use in mines.

IRON AND ILLUMINATING STAIRS.—Peter H. Jackson, San Francisco, California. No. 269,863. Dated Jan. 2, 1883. This invention relates to certain improvements in the construction of iron and illuminating stairs. And it consists in so forming the risers of the stairs that the inner edges of the treads or steps are supported upon their projecting flanges, no intermediate support being necessary, and a part of the finish under the projection of the step is supplied. The molding which forms the finish of the front edge is partly formed upon the edge of the step and partly upon the riser. The bottom riser is made of the full depth, and the grade of the street is conformed to by a tapering filling-in piece which rests upon the lip of the riser, its upper edge supporting the inner side of the tile.

HEADER.—Abraham Miller, Gridley, Cal. No. 269,951. Dated January 2, 1883. This invention relates to certain improvements in headers; and it consists of the header-frame supported upon bearing-wheels in the usual manner, and having a tongue to which the team is attached. This tongue has its front end hinged or journaled to the lower part of the frame below the axles of the bearing-wheels, and may be raised or lowered at this point, the object being to relieve the raising and depressing lever from strain and to balance the action of the driving-gears.

CANNING APPARATUS.—Richard Wheeler, Alameda. No. 270,529. Dated January 9, 1883. This invention relates to an apparatus for putting up all sorts of hermetically sealed goods in an inexpensive manner, and it consists in the employment of a water reservoir with a heater beneath and a series of separate inclosed chambers above, through which steam or hot air is allowed to pass and surround the cans or glass jars containing the substance to be cooked, the cans or jars being placed in the chambers. These chambers are arranged in series, so that either series may be withdrawn at will.

TWO-WHEELED VEHICLE.—Gilbert A. Wright, Leven H. Fowler and Samuel Shaw, Napa City, Cal. No. 269,982. Dated Jan. 2, 1883. This invention relates to that class of two-wheeled vehicles commonly known as "carts," and it consists in a novel arrangement of the shafts with respect to the axle, and of the body with respect to the shafts.

GRAIN SEPARATOR.—Daniel Best, Albany, Oregon. No. 270,001. Dated January 2, 1883. This invention relates to certain improvements in grain separators, and it consists in mechanism by which the amount of shake given the shoes is regulated, and the joints always kept tight and prevented from rattling.

FAUCET.—John L. Berry and Shadrack Gladney, Antelope, California. No. 269,912. Dated January 2, 1883. This invention relates to a new and useful improvement in faucets; and it consists in certain details of construction.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

G. W. McGREW—Santa Clara county.
M. P. OWEN—Santa Cruz county.
J. W. A. WATSON—Tulare and Kern counties.
JAMES C. HOAG—California.
B. W. CROWELL—Los Angeles and San Bernardino counties.
L. WALKER—Sacramento, San Joaquin and Stanislaus counties.
GEO. McDOWELL—Alameda and Marin counties.
N. H. HARGSON—Plumas county.
E. T. THURSTON—San Francisco.

For the Ladies.

A GOOD FAMILY PAPER.—The Illustrated Ladies' Home Journal, published by Dewey & Co., is a valuable monthly, sixteen-page paper, for women everywhere. Several pages are devoted to fashion, in which the most desirable styles for women and children are illustrated with such careful and explicit directions for cutting and trimming that rural wives and daughters may dispense with dressmakers, and yet dress as stylishly as their sisters of the city. Besides fashions, it has entertaining and instructive miscellany for all ages. It is printed on Dewey & Co.'s fine paper, is beautifully illustrated, and, altogether, a very desirable fireside friend.—Flora Kimball, in California Patron.

Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending Jan. 23, 1883.							
HIGHEST AND LOWEST BAROMETER.							
Jan. 17.	Jan. 18.	Jan. 19.	Jan. 20.	Jan. 21.	Jan. 22.	Jan. 23.	
30.272	30.151	30.305	30.442	30.504	30.492	50.528	
30.133	30.037	30.100	30.303	30.430	30.423	50.473	
MAXIMUM AND MINIMUM THERMOMETER.							
51	47	44	45.5	47.5	52	53.5	
43.5	40	37	36	37.5	38.5	40.5	
MEAN DAILY HUMIDITY.							
68.0	63.3	41.0	41.7	52.7	58.3	63.3.	
PREVAILING WIND.							
W	N	N	N	N	NW	N	
253	172	416	133	145	189	178	
WIND—MILES TRAVELED.							
Fair.	Clear	Clear	Clear	Clear	Clear	Fair.	
RAINFALL IN TWENTY-FOUR HOURS.							
.03	.60	.10	.00	.03	.00	.00	
Total rain during the season from July 1, 1882, 9.71 inches.							

Lumber.

Redwood.		Pine.	
CARGOES.		CARGOES.	
Rough.....	@ 8 00	Rough.....	@ 18 00
Surfaced.....	@ 24 00	Surfaced.....	@ 23 00
Floor and step.....	@ 27 50	Floor and step.....	@ 23 00
Retail.		Retail.	
Merchantable No. 1.....	@ 22 50	Rough.....	@ 22 50
Surfaced No. 1.....	@ 27 50	Flooring.....	@ 23 50
Tongue and Groove 30 00.....	@ 7 50	Floor and step.....	@ 23 50
Pickets, rough.....	@ 20 00	Do.....	@ 23 50
do, fancy.....	@ 23 00	Do.....	@ 23 50
do, square.....	@ 27 50	Do.....	@ 23 50

Retail Groceries, Etc.

Butter, California.		Wheat Flour.	
Choice, lb.....	45 @ 55	Yeast Powder, doz.....	50 @ 60
Cheese.....	17 @ 25	Corn Oysters, doz.....	20 @ 30
Eastern.....	15 @ 20	Syrup, S. F. brand, 75 @ 10	
Lard, Cal.....	@ 12	Dried Apples, lb.....	10 @ 15
Eastern.....	20 @ 25	Fig. Prunes.....	12 @ 20
Flour, ex. fine, bbl.....	30 @ 40	Fig. Cakes.....	9 @ 10
Corn Meal, lb.....	20 @ 30	Fig. Kerosene.....	50 @ 60
Sugar, wh. crushed.....	12 @ 13	Fig. Peaches.....	15 @ 25
Light Brown.....	8 @ 9	Fig. Apples.....	10 @ 15
Coffee, Green.....	23 @ 35	French Claret.....	10 @ 25
Tea, fine Black.....	50 @ 60	Cal. doz. bott.....	20 @ 30
Finest Japan.....	55 @ 60	Whisky, O. K. gal 5 @ 60	
Candles, Adm'te.....	15 @ 25	French Brandy.....	40 @ 60
Soap, Cal.....	7 @ 10		

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]
SAN FRANCISCO, Jan. 24, 3 p. m.
SILVER, 1.
GOLD BARS, 890 @ 910. SILVER BARS, 10 @ 18 cent. d'a. out.
EXCHANGE ON NEW YORK, 30 premium; London, 49 @ 49 1/2; Paris, 5 1/2 francs @ dollar; Mexican dollars, 27 1/2 @ 28 1/2; NEW YORK (4 per cent), 120 1/2.

General Merchandise.

WHOLESALE.		WEDNESDAY M., Jan. 24, 1883.	
CANDLES.		Cement, Rosendale.....	
Crystal Wax.....	16 @ 18	Portland.....	7 75 @ 2 00
Paraffine.....	20 @ 23	Portland.....	7 75 @ 4 00
CANNED GOODS.		NAILS.	
Assorted Pie Fruits.....	2 25 @	Assorted sizes, keg.....	3 75 @ 4 00
2 lb. cans.....	2 25 @	OILS.	
Jams and Jellies.....	3 75 @	Pacific Coast Co's.....	00 @ 61 00
Pickles, hf gal.....	3 25 @	Castor, No. 1.....	00 @ 61 05
Sardines, or box.....	1 67 @	do, No. 2.....	00 @ 95
HF Boxes.....	2 50 @ 1 80	Baker's A. A.....	00 @ 30
Merry, Faulk & Co's.....	3 00 @	Olive, Flagnoli.....	00 @ 75
Preserved Beef.....	2 25 @	Palm, lb.....	9 @ 10
2 lb. doz.....	3 25 @ 30	Linseed, Raw, bbl.....	00 @ 60
Beef Tongue.....	5 75 @ 60	Boiled.....	00 @ 65
Preserved Ham.....	5 50 @ 50	Coconut.....	60 @ 60
Scotch Mutton.....	3 25 @ 30	China nut.....	68 @ 63
2 lb. doz.....	5 75 @ 60	Sperm.....	1 40 @
Beef Tongue.....	5 50 @ 50	Coast Whales.....	35 @
do Ham & doz.....	3 00 @ 30	Lard.....	00 @ 100
do Ham & doz.....	2 50 @	Petroleum (110).....	18 @ 22
do Ham & doz.....	2 50 @	Petroleum (150).....	23 @ 35
COAL—Jobbing.		PAINTS.	
Australian, ton.....	@ 8 60	Pure White Lead.....	7 @ 8
Coos Bay.....	@ 6 10	Whiting.....	14 @
Bellingham Bay.....	@ 6 50	Putty.....	4 @ 5
Seattle.....	@ 13 00	Chalk.....	14 @
Miss Diablo.....	@	Carla White.....	23 @
Lehigh.....	@	Ochre.....	34 @
Liverpool.....	@ 9 50	Averil mixed Paint.....	34 @
West Hartley.....	@ 8 50	White & Tint, 2 00 @ 2 00	
Scranton.....	@ 8 50	Green, Blue and	
Vancouver Id.....	@	Ch Yellow.....	3 00 @ 3 50
Wellington.....	@ 8 50	Light Red.....	3 00 @ 3 50
Charcoal, sack.....	@	Metallic Roof.....	1 30 @ 1 60
Ooke, hush.....	@	SALT.	
COFFEE.		Oak Bay, ton.....	00 @ 22 00
Sandwich Id.....	@	Common.....	6 50 @ 14 00
Gusta Rica.....	12 @ 14	Carmen Id.....	14 @ 22 00
Guatemala.....	12 @ 14	Liverpool fine.....	14 @ 20 00
Java.....	18 @ 20	SOAP.	
Manilla.....	15 @	Castile, lb.....	9 @ 10
Ground, in cs.....	@ 22 1/2	Common brands.....	4 @ 6
FISH.		SPICES.	
Sack Dry Cod.....	@ 7	Cloves, lb.....	37 @ 40
do in cases.....	@ 7 1/2	Cassia.....	20 @
Eastern Cod.....	@ 7	Nutmegs.....	85 @ 90
Salmon, bbls.....	7 00 @ 7 50	Pepper Grain.....	15 @ 16
HF bbls.....	3 50 @ 4 00	Pimento.....	16 @ 17
1 lb. cans.....	1 12 @ 1 25	Mustard, Cal 1 lb	@ 1 25
Phil Cod, bbls.....	@	SUGAR, ETC.	
HF bbls.....	@	Cal. Cane lb.....	@ 11
Mackerel, No. 1.....	8 60 @ 9 00	Fine Crushed.....	@ 11 1/2
HF bbls.....	1 65 @ 1 70	Granulated.....	@ 11
Ex Mess.....	3 00 @ 3 25	Golden C.....	@ 9 1/2
Pickled Herring, box.....	3 00 @ 3 50	Cal Syrup, kgs.....	65 @
LIME, etc.		Hawaiian Molasses.....	25 @ 30
Plaster, Golden.....	3 00 @ 3 25	Young Hyson.....	40 @ 65
Gate Mills.....	3 00 @ 3 25	Moyame, etc.....	40 @ 65
Lard & Plaster, ton.....	10 00 @ 12 50	Country pkd Cinnamon.....	35 @ 76
Lima, Santa Cruz.....	1 25 @ 1 50	Perforated.....	30 @ 35
hbl.....	1 25 @ 1 50	Hyson.....	27 1/2 @ 32
		Fuoo Chow.....	35 @ 37
		Japan, medium.....	35 @ 37

San Francisco Metal Market.

[WHOLESALE.]		THURSDAY, Jan. 24, 1883.	
ANTIMONY.		IRON.	
Per pound.....	@ 15	American, Pig, soft, ton.....	@ 63 00
Per pound.....	@ 15	Scottish, Pig, ton.....	@ 62 00
Per pound.....	@ 15	American, White Pig, ton.....	@ 63 00
Per pound.....	@ 15	Oregon Pig, ton.....	@ 63 00
Per pound.....	@ 15	Clipper Cap, Nos. 1 to 4.....	@ 63 00
Per pound.....	@ 15	Refined Bar.....	@ 63 00
Per pound.....	@ 15	Horse Shoes, keg.....	@ 5 50
Per pound.....	@ 15	Nail Iron.....	@ 7 1/2
Per pound.....	@ 15	Norway, according to thickness.....	@ 6 1/2
STEEL.		COPPER.	
English Cast, lb.....	16 @ 25	Ingot.....	@ 22
Black Diamond, ordinary sizes.....	15 @ 16	Sheet.....	@ 37
Drill.....	15 @ 16	Sheating, Tinned 14 1/2.....	@ 31
Machinery.....	12 @ 14	Nails.....	@ 31
LEAD.		Bolt.....	@ 33
Pig.....	@ 43 @ 54	Old.....	@ 8
Bar.....	@ 6	Bar.....	@ 8
Pipe.....	@ 6	Cement, 100 line.....	@ 15 1/2
Sheet.....	@ 9	ZINC.	
Shot, discount 10% on 500 Bags.....	@ 2 10	By the Cask.....	@ 9
Drop, per bag.....	@ 2 10	Zinc, sheet 7 1/2 @ 7 to 10 lb, less the cask.....	@ 10
Puck.....	@ 2 30	Nails.....	@ 4 75
Child.....	@ 2 50	QUICKSILVER.	
TIN PLATES.		By the flask.....	@ 37 1/2
Charcoal.....	7 25 @ 7 50	Flasks, new.....	@ 1 25
Ooke.....	6 25 @ 6 40	Flasks, old.....	@ 1 05
Banca Iron.....	@ 65 00	Leather.	
Australia.....	@ 65 00	WHOLESALE.]	
I. C. Charcoal Roofing 14 1/2.....	@ 6 90	WEDNESDAY M., Jan. 24, 1883.	
Sole Leather, heavy, lb.....		Light.....	30 @ 32
Light.....	25 @ 28	Dotot, 5 to 10 Kil, doz.....	35 @ 40
11 to 13 Kil, doz.....	50 @ 55	11 to 13 Kil.....	50 @ 55
14 to 16 Kil, doz.....	50 @ 55	Second Choice, 11 to 16 Kil.....	40 @ 45
Simon Ulmo, Females, 12 to 13 Kil.....	52 @ 56	Simon Ulmo, 12 to 13 Kil.....	52 @ 56
11 to 15 Kil.....	60 @ 65	11 to 15 Kil.....	60 @ 65
16 to 20 Kil.....	60 @ 65	Simon, 13 Kil.....	60 @ 65
20 Kil.....	60 @ 65	20 Kil.....	60 @ 65
Kips, French, lb.....	85 @ 90	20 Kil.....	60 @ 65
Cal do.....	55 @ 60	French Sheep, all colors.....	12 @ 15
French Sheep, all colors.....	12 @ 15	Eastern Oak for Backs, lb.....	1 00 @ 1 25
Eastern Oak for Backs, lb.....	1 00 @ 1 25	Sheep Roans for Topping, all colors, doz.....	9 00 @ 10 00
Sheep Roans for Topping, all colors, doz.....	9 00 @ 10 00	Cal do.....	60 @ 65
Cal do.....	60 @ 65	Cal Russet Sheep Linings.....	3 10 @ 5 50
Cal Russet Sheep Linings.....	3 10 @ 5 50	Boat Legs, French, pair.....	@ 4 50
Boat Legs, French, pair.....	@ 4 50	Good French Calf.....	@ 4 00
Good French Calf.....	@ 4 00	Best do do do.....	4 75 @ 5 00
Best do do do.....	4 75 @ 5 00	Leather, Harness, lb.....	35 @ 40
Leather, Harness, lb.....	35 @ 40	Fat Bridle, doz.....	45 @ 50
Fat Bridle, doz.....	45 @ 50	Shirting, lb.....	33 @ 37
Shirting, lb.....	33 @ 37	Welt, doz.....	30 @ 36
Welt, doz.....	30 @ 36	Buff.....	17 @ 20
Buff.....	17 @ 20	Wax Side.....	19 @ 20

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our

“Abel Stearns RANCHOS.”

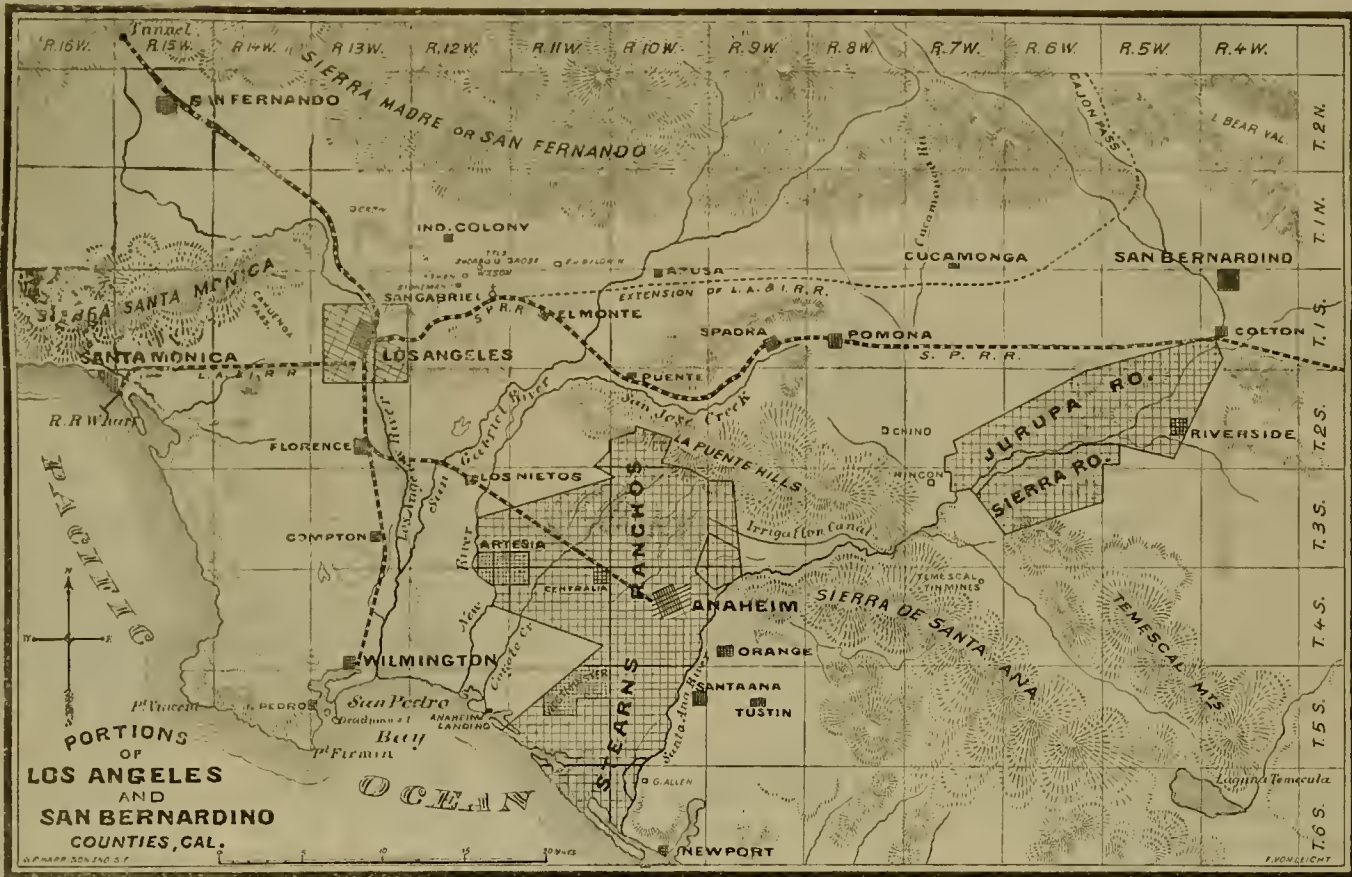
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Sight Drop Cylinder Lubricator,

Albany Spindle Oil,

Genuine West Virginia Lubricating Oil.

The above can be gotten from us or our AGENTS ONLY.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Company
ASSESSMENT, NO. 44.

Levied.....January 10, 1883
Delinquent.....February 15, 1883
Day of Sale.....March 5, 1883
Amount per Share.....Fifty Cents

ALFRED K. DUBROW, Sec'y.
Office—Room 69, Nevada Block, 309 Montgomery St.

Continental Works, Brooklyn, N. Y.
DUC'S MECHANICAL ATOMIZER OR PUVERIZER.



For reducing to an impalpable powder all kinds of hard and brittle substances, such as QUARTZ, EMERY, CORUNDUM, GOLD AND SILVER ORES, BARYTES, COAL,

PHOSPHATE ROCK, ETC.

It is simple and not liable to get out of order. Revolving Shell being constructed of Siemens-Martin steel, and all parts mechanical in design and of first-class construction. Weight 6,500 lbs.; heaviest piece, 1,500 lbs. It will pulverize 7 to 10 Tons in 10 Hours with 30 H. P. For circulars and full particulars apply to or address,

THOS. F. ROWLAND, Sole Man'fr, Brooklyn, N. Y.

Mining and Other Companies.

STOCK DIVIDEND.

At a Meeting of the Directors

—OF THE—

Gila Silver Mining Company,

Hold this day, a Stock Dividend of Two Shares for each outstanding share was declared, deliverable on and after February 1, 1883.

J. T. McGOOGHEGAN, Sec'y.

NOTICE OF DISSOLUTION.

OFFICE OF THE

South Comstock Gold and Silver Mining Company, No. 309 California Street, San Francisco, California, January 18, 1883.

Notice is hereby given that, pursuant to the provisions of Title Six of the Code of Civil Procedure of the State of California, a meeting of the STOCKHOLDERS of the SOUTH COMSTOCK GOLD AND SILVER MINING COMPANY, a corporation organized and existing under the laws of the State of California, will be held on MONDAY the FIRST (5th) day of FEBRUARY, A. D. 1883, at the hour of TWO o'clock P. M. at said Company's office in room No. 4 of premises No. 309 California Street, in the City and County of San Francisco and State of California, to consider and vote upon the question of the voluntary dissolution of said Corporation and such other business as may properly come before said meeting.

By order of the President and Board of Trustees,
J. M. BUFFINGTON, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company.

San Francisco, January 25, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 15, of five cents (5c) per share, was declared, payable on Monday, February 12, 1883. Transfer books closed on Friday, February 2, 1883, at 3 o'clock P. M. This dividend is payable at the Farmers' Loan and Trust Company in New York on all stock issued there, and at the office in this city on all stock issued here.

WM. WILLIS, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

PATENTS

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Inventors' Institute

—OF—

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THE CELEBRATED A BRAND.

Shipped Direct from the New Almaden Mine, New Almaden Station, Santa Clara Co., Cal.

For sale in any quantity. Trademark A on top of Flasks secured by United States Patent, and registered. Flasks contain 7 1/2 lbs. Quicksilver. Weight and purity guaranteed.

CARLOAD LOTS will be shipped from San Jose, f. o. b., for Nevada, Arizona, New Mexico, Montana and Idaho or Utah, or delivered at Pacific Mail Steamship Co.'s wharf, and Depot of S. F. R. R. Co., San Francisco, without charge. Railroad rates from San Jose are the same as from San Francisco.

J. B. RANDOL,

P. O. Box, 1073. 320 Sansome Street, S. F.

Carson and Colorado Railroad.

(NARROW-GAUGE.)

The Company announces the completion of its line March 1, 1882, to CANDELARIA, Columbus Mining District, Esmeralda Co., Nev., 158 miles from Mound House (Junction with Virginia and Truckee Railroad).

STAGE CONNECTIONS.

At Hawthorne with U. S. Stage Company's daily coaches for Aurora (26 m.); Bodie (37 m.); Lundy and Bridgeport. At Luning (125 miles from Mound House) with Gilmer, Salisbury & Co.'s tri-weekly stages (leaving Tuesday, Thursday and Saturday mornings) for Grantsville, Belmont and Tule.

At Belleville (150 miles from Mound House) with Beloville and Independence Stage Co.'s stages for Benton (40 m.), Bishop Creek, Big Pine and Independence. At Candelaria, with U. S. Stage Co.'s stages for Columbus (8 m.), Silver Peak, Montezuma, Alida Valley, Gold Mountain, etc.

THROUGH TICKETS

To the above points for sale at San Francisco, Sacramento, Reno, Carson and Virginia R. R. Ticket offices.

This is the direct and natural route for Passengers and Freight, to points in Southern Nevada, Mono and Inyo counties, California. The line, laid with steel rails and redwood ties and equipped with new and first-class rolling stock, is penetrating new and most promising Mining Districts which are now attracting deserved attention throughout the country.

For information on through freight rates apply to H. M. YERINGTON, D. A. BENDER, Gen'l Supt. Gen'l Freight & Pass. Agent, Carson, Nev.

GILLES H. GRAY.

JAMES HAYEN.

GRAY & HAYEN,

Attorneys and Counsellors-at-Law,

530 California St. SAN FRANCISCO

CAREFUL MAILING.—We take all possible care to mail our papers promptly and correct, and we seldom hear of complaints in its postal delivery; yet we would thank any subscriber, who may happen to miss a copy, to send us at once a postal card, giving full address and the date of the number missed, and we will remail them.

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 SAN FRANCISCO, CAL.

Agents for C. H. Baker's Mining Horse Power;
 Bishop's Mining Pump Apparatus; C. H. Baker's Quick-
 silver Feeder.

Oakland Iron Works.

We are now prepared to do all kinds of
Heavy and Light Castings and Machinery
 Marine and Stationary Engines, Rock Breakers, Stamp
 Mills, Pumping Machinery, Donkey Engines, etc.

Good Facilities for Shipping on Cars.
 Works Located Cor. Second and Jefferson
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SCOVILLE & CO.

UNION IRON WORKS,

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MANUFACTURERS OF

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Kinds of Machinery for Mining Purposes.
 Flouring Mills, Saw Mills and Quartz Mills Machinery
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Front Street, Between N and O Streets,
 SACRAMENTO, CAL.

Golden State & Miners Iron Works,

Manufacture Iron Castings and Machinery
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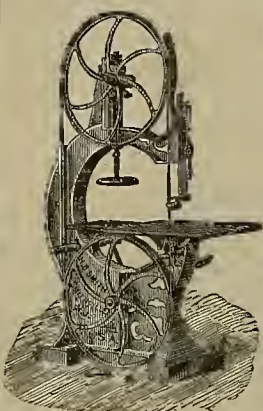
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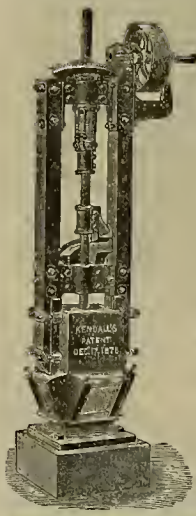
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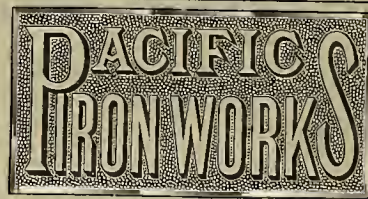
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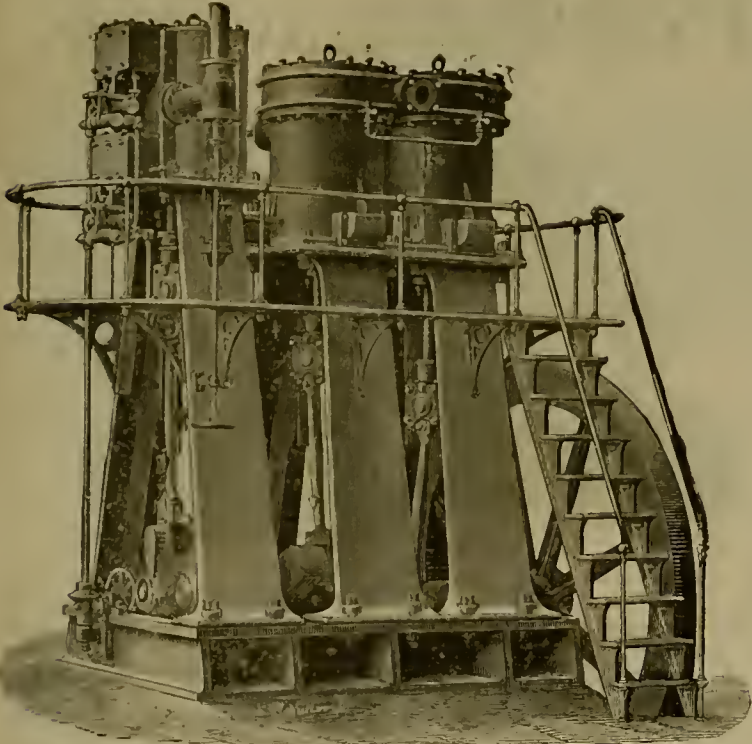
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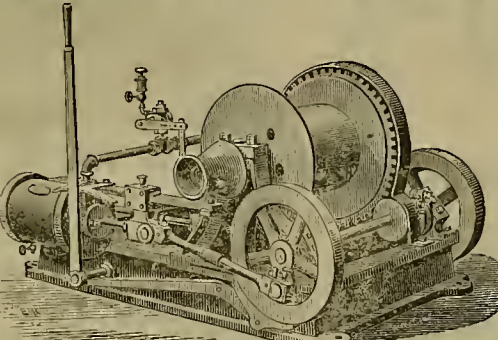
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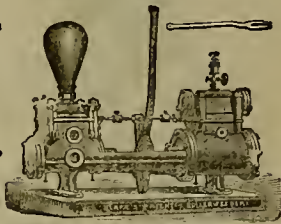
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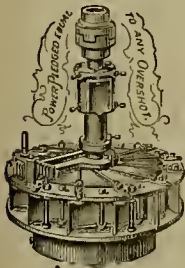
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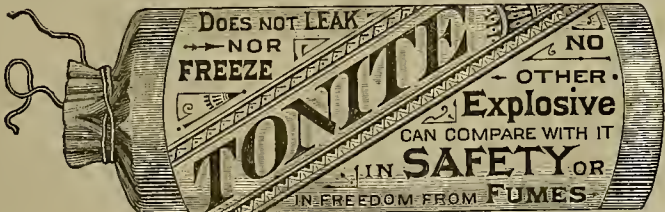
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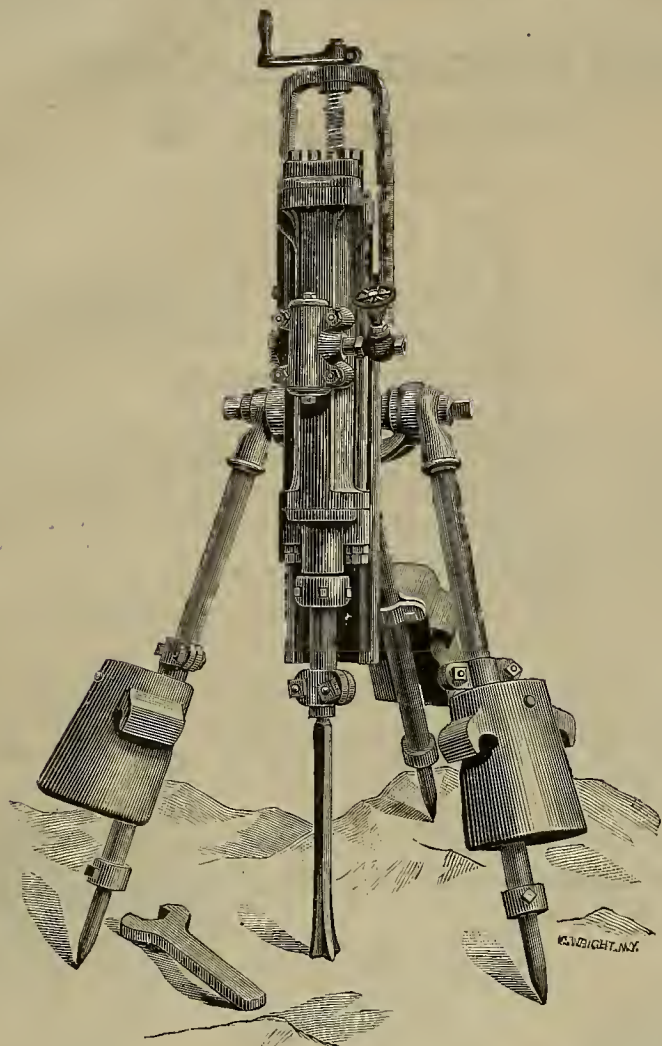
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Removal of Office of Judson Manufacturing Co.

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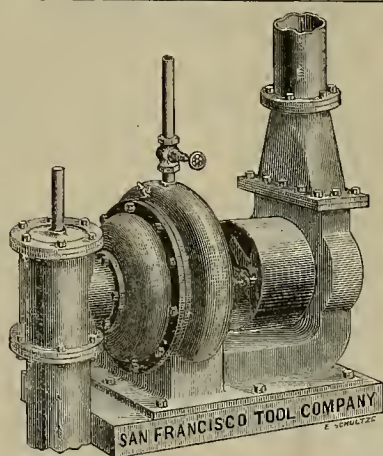


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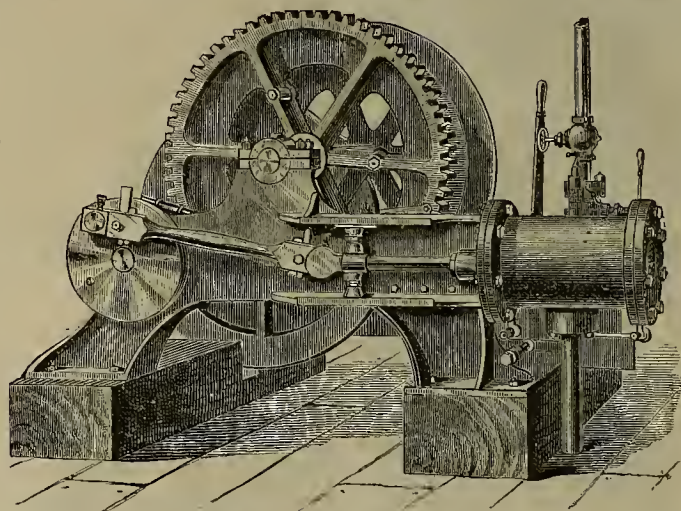
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Have Removed from 323 and 325
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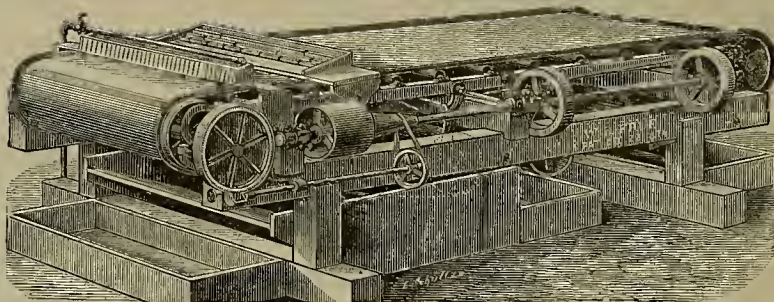
1- 10x14 Single. 1- 8x12 Double.

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THE FRUE ORE CONCENTRATOR,

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Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order, and ready to make tests, at the office of Hinckley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ore is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

Room 7, 109 California Street,

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Nov. 6, 1882.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 3, 1883.

VOLUME XLVI
Number 5.

Operating Pumps in Mines.

Mr. John Huffer, of Jacksonville, Oregon, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a new method of operating pumps in mines or deep wells, where the pumps are located on different levels or stations. The object of the invention is to furnish means for operating all the pumps upon the various levels or stations at the same time by the application of the original power, which, by certain mechanical devices, is transmitted throughout the entire system.

Across the top of the shaft is suitably journaled the driving shaft, upon which is a pulley on which is firmly clamped a flat wire cable. This cable is clamped to its center at the top of the pulley to prevent slipping, as its ends are loose and swing down upon each side over the face of the pulley. This power pulley does not make a complete revolution, but oscillates, that is, it revolves part way and then back.

At the first side station or level is journaled a horizontal shaft, carrying upon one end a double-faced pulley. Upon the outer of these faces is clamped at the center and underneath the pulley another flat cable, the ends of which pass about the face of the pulley at its sides, and extend up to connect with the lower ends of pieces of round cable already attached to the flat cable of the power pulley, thus making a connection with the upper pulley. In the pieces of round cable connecting the flat cables are placed set screws or links, whereby the cable connection can be tightened and adjusted. Over the other face of the pulley at the station is another flat belt connected in a similar manner to that already described, with the pulley at the next station by similarly arranged belts. Each level is connected with the one above in this way, and at each station is a pump.

The shafts of each of the sets of pulleys have pinions at their ends, these pinions engaging with a rack, either formed with or attached to the piston rod of the pump. Power is applied to the main driving shaft and pulley at the surface to give the pulley an oscillatory motion. This is transmitted through the continuous belt or cable connections to the pinions at the several stations, and by means of these pinions the piston rods of the pumps are moved back and forth to operate the pumps. The pumps may be single or double-acting, or two single-acting pumps, one at each end of the rack, may be used.

The pumps may be operated at any angle desired, by clamping the flat cables at suitable points upon their pulleys, and by the interposition of guide pulleys the power may be transmitted to them in any location, as in a tunnel or down another shaft. The general principle of operating a series of pumps simultaneously is not new, but the other devices differ from Mr. Huffer's. The vibrations of the cable is provided for, and also the stretching of the cables.

The Chico Record says: An industrious miner from the Butte Creek region came to town this morning with over \$1,600 worth of gold dust, which he deposited in the Bank of Butte County. He said that the miners along the creek are now idle on account of the scarcity of water, but they hope to be at work when the spring rain sets in.

In the Arizona Legislature the bill to pay Prof. Church the expenses he claimed to have incurred as Commissioner to Denver was defeated.

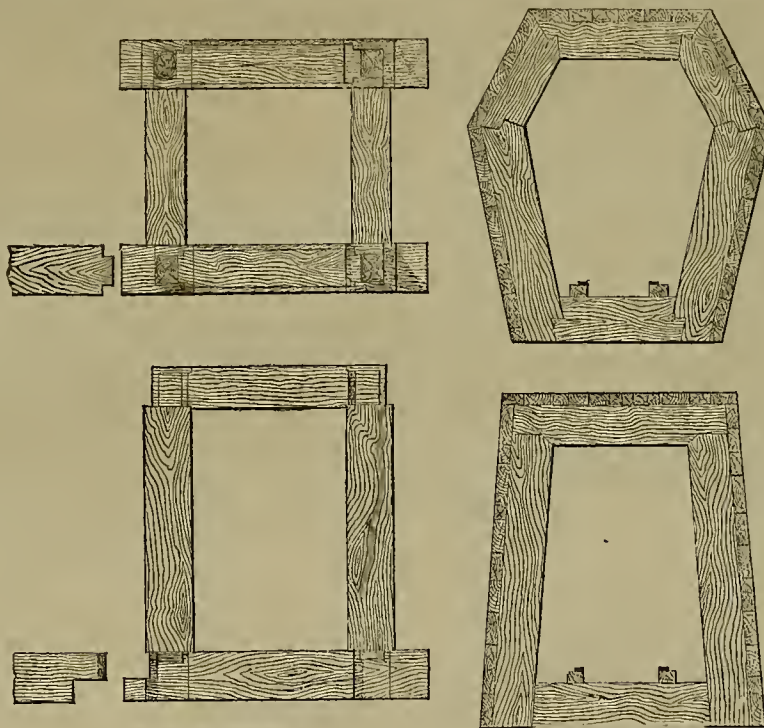
Mine Timbering.

On the Comstock the material enclosing the ore bodies in bonanzas is of a very unstable character, and involves an immense cost in timbering. The ore bodies frequently have selvages of clay of considerable thickness. The whole is soft and yielding, and owing to the clayey nature swells on exposure to the air, exerting an enormous pressure. The extraction of such immense bodies of ore and the opening of such extensive chambers with insufficient support of the country rock or vein matter induce large movements of the surrounding masses. Great caves of ground from old stopes occur. The difficulty of sustaining ground of this nature by any method of timbering is not only great in itself, but is much increased by the

timbers that are framed together on rectangular sets four to five feet square, the floors being supported one above the other by posts seven to eight feet high. The two left-hand figures of the engraving illustrate the method of timbering in stopes. They present an elevation and floor of a single set, showing the details of framing. The timbers are usually of 12-inch stuff and square-hewn or sawed. They are formed with much care so that the various parts fit snugly and nicely together.

Drift Timbering.

The method employed in timbering drifts or tunnels is the same as is generally in use in other districts. The timber is, however, all square, varying in size from 8 to 13 inches. Ordinary working drifts, such as those connect-



STOPE TIMBERS.

DRIFT TIMBERS.

large size of the chambers rendered vacant the extraction of the bodies of ore.

Methods ordinarily in use in veins of moderate width and in firm rock were found to be insufficient. To meet the necessities of the case, a method of timbering was introduced, which is said to have been devised by Mr. Diedeshimer, which, though meeting at first with some opposition, on account of its great cost, has been generally adopted, and is used in all the mines on the lode. This consists of framing timbers together in rectangular sets, each set being composed of a square base, placed horizontally, formed of four timbers, sills and iron pieces, four to six feet long, framed together, surmounted by four posts six to seven feet high at each corner, and capped by a framework similar to that of the base. These cap pieces forming the top of any set are at the same time the sills or base of the next set above, the posts, as the sets rise one above the other in the stopes, being generally placed in position directly over those below.

This somewhat complicated system of timbering may also be described, in other terms, as a succession of horizontal floors composed of tim-

bering the main shaft with the vein, are about five feet wide in the bottom, four feet wide in the top and seven feet high. They are usually timbered with vertical sets or frames, consisting of two posts, a cap and a sill or spreader. These posts are mainly seven feet two inches high, the cap three feet nine inches, and the sill four feet nine inches long. These sets are placed from two to six feet apart, according to the nature of the ground. They are covered on the outside with lagging, which is likewise varied according to condition, consisting sometimes of six-inch scantling, in pieces five or six feet long, and placed several inches apart, sometimes of three-inch or four-inch plank, placed close together, inclosing both sides and top, and sometimes the bottom. Lagging, consisting of light scantling, placed several inches apart, is often preferred in heavy swelling ground, as the pressure breaks in the pieces of scantling before effecting the stranger timbers of the tunnel sets. By picking down the intruding clay and relieving the pressure, the more expensive timbers are saved. String pieces, usually of square stuff, or three inches by four inches, are laid in the bottom on the sill timbers, and shod with flat iron one and one-half inches wide by one-fourth inch thick to serve as track for the drift cars, and a footway of two inch plank is laid between the rails.

The two right-hand figures of the engravings illustrate the method of framing the tunnel sets.

Alaska as a Mining Region.

Just at the present time there is some unusual "interest" in the mining prospects of Alaska, brought about, no doubt, by certain vague rumors current of late regarding supposed rich placer discoveries somewhere about the headwaters of the Yukon river. The party that made the trip up the river is one composed of old miners and prospectors, equipped with steamer, boats and canoes, with supplies for three years, and everything in first-rate style. It was expected to remain over winter and do the prospecting this summer, as they would have little time the past summer. It seems somewhat unreasonable that these men, after all the trouble and expense they have been to, would publish abroad the fact of striking rich diggings until at least they had some chance to work them. They were not a lot of "tender-feet," to draw a crowd to a region where they had it all their own way; at least it is hardly probable, under the conditions, the men would "blow" about the discovery. It is best, therefore, to receive with caution stories that may be current.

These views are confirmed by a conversation we had this week with James Williams, a miner who has spent the best part of the last seven or eight years prospecting in the northern country, and who has been in the city this winter, but will return to Alaska on the 20th inst. Mr. Williams has been on the Stickeen river and other British Columbia mining regions, and is familiar with Alaska also, owning claims now at Harrisburg, where the principal mines of Alaska are situated.

In the season, Mr. Williams tells us, there are about 200 miners about Harrisburg. Very little prospecting has been done outside of the camp itself. They know nothing so far of the ledges, but there are a few good paying placer claims. No one knows as yet the extent of the field. The claims are in high banks or benches, and the gravel is from 3 to 20 feet in thickness. The material is a sort of decomposed stuff—a mixture of broken quartz and other debris. Sometimes a reef of quartz will be met with in the gravel bed.

Water is plenty, and is brought to the gravel beds in ditches from the creeks. There is no company furnishing water, the miners bringing it themselves to their claims. The season lasts from five to six months, but varies considerably. It is expected it will commence in May this year.

The miners at Harrisburg take up 200 feet frontage on the hill ground, and 1,000 feet running back. Most of the mines are on the mainland, but there are some on the islands. There are two companies mining on Douglas island.

All the region close around has been taken up. Some little prospecting outside has been done, but it has not paid. The mines are not in a regular gold belt; it does not seem to be a regular wash. The belt cannot be traced at all. Wherever stringers of quartz are found placer ground is met with around it. The quartz and placer ground have to be recorded separately. Four hydraulic nozzles (two of Hoskins' pattern) will be sent up on the steamer that goes this month. These mines are most of them worked by hydraulic process. We shall have more to say about the mining region of Alaska in next week's PRESS.

The work on the Channel tunnel is still going on quietly.

CORRESPONDENCE.

Colorado Notes.

EDITORS PRESS:—Mining is being interfered with somewhat by the recent cold weather and snow, yet many properties, being well prepared for winter, continue their working without any difficulty.

The Red Mountain district, 8 miles from Ouray, in the San Juan country, is not to be deterred by wind or weather, and is developing some fine mines through the snow. This district probably possesses some of the richest mines in the State. In fact, they are striving hard to have it become known as "New Leadville" or "Second Carbonate Camp." It is true they are making some wonderful discoveries for a camp only five months old, three being winter months. Old Leadville miners went in there in December, and are living in tents and prospecting, and

Sinking Shafts Through the Snow.

There are some gray carbonates of lead found associated with galena, but not sufficient to give the camp much notoriety as a carbonate camp. The ores are principally sulphides of lead and copper. While not generally high grade, the ore lies in vast bodies, and probably averages \$50 per ton. Among the mines of this district is the Congress, with an ore body 18 ft. in width, from which 110 tons of ore was taken which netted \$100 to the ton in copper, silver and gold. The Hudson, with a shaft 52 ft. deep, has a body of ore 11 ft. thick, which will run \$90 to the ton. The Yankee Girl is evidently quite a bonanza. It has two shafts, one 42 and the other 50 ft. deep. The former is in a solid body of galena ore 40 ft. in thickness, and no bottom reached yet. This ore nets \$35 to \$50 per ton in St. Louis. The Yankee Girl was sold on the 20th of last September for \$125,000 cash. The D. & R. G. R. R. will, it is expected, extend their line to Ouray next summer, and this camp will be brought into prominence.

The Electric Light

Is being adopted in a number of mines throughout the State. The Silver Cord group of Leadville employ seven electric arc-lamps on its premises, which are pronounced very satisfactory illuminators. The ore-house contains two of these lights, and the ore is sorted with fully as great precision as can be done by daylight. The Iron Silver Mining Co. of the same district are also considering the feasibility of working by the electric light.

It is estimated that a plant such as the Iron Silver Company think of putting up would cost, all told, between \$2,000 and \$2,500, and at that price it would unquestionably prove a beneficial and saving investment to any mining company employing a large force of men at night. The miners of Alma, Park Co., held a meeting on the 4th inst. for the purpose of considering the most effective means of

Exposing All Wild Cat Schemes,

Fostering honest enterprises and preventing unprincipled individuals from employing miners, and creating other obligations, and in the end have no funds to pay them. If miners and business men of other camps would maintain a like front toward corrupt schemes and companies, honest investors would receive great encouragement.

Some excitement and no little scandal has been occasioned in mining circles here by the recent change of

Management of the Robinson

Mine, the outgoing manager being accused of some decidedly disreputable actions in connection with his management of that property. It is alleged that he leased an adjoining mine and connected it with one of the richest ore bodies in the Robinson by a tunnel, through which he extracted a large amount of high-grade ore. Also, that he sent a great many car loads of ore to the smelter in his own name, and appropriated the returns to his own use. It is to be hoped that he can disprove these charges, as such occurrences, coming to the knowledge of capitalists, work an inestimable injury to legitimate mining.

Messrs. Geo. M. Miller and Felix McLaughlin, extensive mine operators of Park Co., returned yesterday from a tour of inspection through New Mexico. They do not think very highly of that country, and say that Colorado offers better inducements for investment than New Mexico.

C. F. BLACKLEDGE.

Denver, Col., Jan. 21, 1883.

ELECTRICITY ON TAP.—Prof. Brush, President of the electric light company bearing his name, has succeeded, it is claimed, in perfecting a system for storing electric power. The invention consists of a box containing cells, in each of which is suspended two lead plates electrically treated and immersed in acidulated water. These plates are called accumulators, on which is stored electricity. The batteries can be packed and shipped as merchandise, and handled without danger. The capacity of the battery depends upon the number of cells. The electricity loses none of its force from storage, and can be used for any purpose for which it is needed.

The Floridas.

The Florida mountains, that on a bright day can be seen for miles from the plain on which Denning, New Mexico, is situated, formed for many years a safe retreat for the bloodthirsty Apache, and were shunned by all prospectors, are at last upon the eve of an era of prosperity, and their hidden treasures are being torn from their bowels by the miner. Although there are no well-developed mines in these mountains, the ore that is now being produced is of an excellent character, and from the size of the veins, the district bids fair to take a front rank as a bullion producer when smelting works are established at some adjoining camp, and more capital can be attracted to work the many promising claims. The ore is similar in character to that found at Cook's Peak, and is mostly composed of carbonate of lead, carrying silver. It is soft and easily worked. As an example of this, it is said that three men were able to mine and hoist nine tons of ore from a mine in 12 hours, a most remarkable feat. The Silver Cave mine, recently bought by J. E. Carroll & Co. for \$25,000, is an excellent piece of property. It is situated about 28 miles from Denning, by the road that winds around the mountain and passes through the pass between the Little and the Big Floridas. Five hundred tons of ore from this mine shipped to the Shakspeare smelter for reduction gave very satisfactory results, running from \$50 to \$68 per ton in silver and from 50 to 60% in lead. The vein that has been dipping constantly into the mountain side now descends almost perpendicularly, and at the bottom of the shaft is five feet wide. Assessment work has been done on several other mines in this vicinity, and most of the claims are looking well.

Horton's camp, situated on the west end of the main range of the Floridas, is about 12 miles from Denning by road, and contains some of the best prospects in that section. On the Carbonate cave mine thirty-five feet have been sunk and very good mineral is being produced, specimens of which assayed 200 ounces in silver and 50% in lead. The vein is a large one, probably 10 or 12 ft. wide, no foot walls having as yet been found.

The Black Bear at a depth of 20 ft. shows a vein 8 to 10 ft. wide of ore running from \$40 to \$75 silver and from 35 to 40% lead. Mr. Horton has done the assessment work on 10 other claims, all of which contain rich ore of the same description as the above.

Messrs. Shaw, Arnold and Ensign own five claims at Mineral Cave, between Horton's and Cedar springs, where excellent water is found full of gravel and supposed to have run dry, but when its basin was scooped out, it ran full to the edge once more.

The Mountain Boy, the most developed mine as yet, at Mineral cave, is but 12 ft. in depth, but carries ore running 33 ounces in silver. The vein, which was but 18 inches wide on the surface, is four feet in the bottom, and is becoming richer as it goes down. The walls are well defined, being granite on one side and porphyry on the other. The southwest extension of the Mountain Boy at a depth of five feet contains a good vein running 28 ounces in silver. The other three locations have not yet been worked, but good walls are seen on the surface of each one, and the surface rock assays from 10 to 30 ounces of silver. Wood and water are found in the mountains in sufficient quantities for camping purposes, but there is not enough of either to run mills.—*New South-west.*

The Shakspeare Smelter.

The smelter, which was completed in February, 1882, was erected by the Shakspeare Consolidated Smelting Company. It was bought by A. M. Gmelting, H. W. Schmidt and the Carroll brothers, George L. and J. E., some four months since. About \$18,000 were invested in the erection of the works. It commenced running in February, and in three weeks turned out two car loads of bullion which averaged 500½ ounces of silver and 8½ ounces of gold to the ton. The ores treated were from the Victoria and Last Chance mines. The second run was in June—ten days—resulting in one car load of bullion which yielded 465 ounces of silver and 8½ ounces of gold to the ton, from the same mines.

The third run was made in November—fifteen days—producing four car loads of bullion (60 tons) averaging 250 ounces of silver and one-half ounce of gold. The ore for this run was from the Floridas and Last Chance.

The fourth run was made in December, just previous to our visit—eight days—upon copper ore from the Superior mine. The result was fifteen tons of 97 per cent. copper, 100 ounces of silver and 3 ounces of gold, a total value of \$450 a ton, together with four tons of copper mat assaying 81 per cent., worth \$243 per ton.

At the time of our visit the smelter was ready to start the next day with quite a quantity of Superior copper on hand, and 600 tons of galena ore, which would yield from 30 to 40 ounces per ton.

The difficulty they have had to contend with is lack of ore. With millions of tons within 10 miles of them, it is difficult to obtain the comparatively small quantity necessary to keep the smelter running. Those who are getting it out in any quantity are proposing to erect their own reduction works and have no ore to sell.—*Lake Valley Herald.*

Making White Lead.

The New Germania Works, Near Salt Lake.

At the Germania smelting and refining works, south of this city, says the Salt Lake *Tribune*, work goes on day and night without interruption, and a constant stream of metal is pouring from its furnaces. The plant extends over a large surface, and there are all the conveniences of railroad tracks for bringing in supplies. Two stacks are run at a time, while two others remain idle, thus giving an opportunity for repairs. It requires from 80 to 90 tons of ore and fluxing materials to feed the furnaces, while coke and charcoal make up 12 or 14 tons more. The quantity of coke is two or three to one of charcoal. It takes from two to three car loads of lime rock and about the same amount of iron ore per day. The lead and silver ores come from Bingham, Alta, Park City and other places in Utah, Nevada and Idaho. About the works there are employed about 80 men.

In the earlier days of the Germania, it was their custom to send the product of the smelters to market in the form of base bullion. This was found to be less profitable to the company than it would be to separate the precious metals from the lead. The refining department has been successful in producing fine bullion, and establishing for the works a reputation for the quality of its refined lead, said to be chemically pure. This lead has commanded a ready market for the manufacture of shot, white lead, and for shipment to China and Japan for use in the arts there. The entire smelting and refining works appear to be under excellent management, and operated so as to save all the metal possible in the process of reduction. All the latest improvements, such as dust collecting flues, improved machinery, etc., are found here.

For several months past the company have been engaged in perfecting their plans, erecting buildings, purchasing machinery, and getting everything in readiness for the new

White Lead Works.

This is altogether a new enterprise in the Rocky mountains, there being no such works between the Missouri river and California. For this new business of the company a building 75x125 ft., and two stories high, was erected, having solid brick walls and very strong framework for the floors and roof. At the south end of this large building is another 75x40 ft., one-story high, in which is placed the motive power on one side and machinery on the other.

The New System.

Under the old system of manufacturing white lead, it required from four to six months to reduce thin sheets of lead placed in acids to white lead through oxidation; but the new process adopted by the Germania Co. does this in from 15 to 20 days, and produces a better article than under the old plan. The mode of manufacture does not appear complicated, and yet it is a very interesting process. Refined lead is taken into the factory in bars weighing nearly 100 lbs. These are cut for convenience in handling and for expedition in melting, after which the pieces are fed into a kettle and melted. On one side of this kettle a number of small tubes project downward at an angle of about 45°, and having a small stamp at the lower end. Similar tubes connected with a steam pipe and placed slightly inclined upwards have their point of discharge almost in contact with the upper pipes. As the lead in a molten state passes out of the pipes in a fine stream, it is blown by a jet of steam into a large room prepared for the purpose. The lead thus treated falls to the floor in the form of minute granules, after which it is taken to the second floor by means of an elevator. On this floor there are 21 revolving cylinders, made of wood and heavily ironed. These are in size five feet in diameter and ten feet long, inside measurement. They have two iron girdles around them for the purpose of support, and, resting on wheels, the cylinders are caused to revolve similar to those used for drying and roasting ores.

At each end a pipe enters for the purpose of conducting currents of carbonic acid gas, and there is provision made for filling and unloading them. When in operation three tons of prepared lead will be placed in each of these cylinders, with proper proportions of acetic acid and water, and then the cylinders will be put in motion. Carbonic acid gas is collected from the spent gases of the boiler furnace, and passed through the cylinders while still warm, causing rapid oxidation. After this process has gone on a sufficient length of time, the charge will be taken out and run to large tanks below, there to be agitated and washed, after which the mixture will be permitted to settle. Such particles as have not been thoroughly converted into the pigment desired will sink to the bottom and be covered with pure white lead, after which the water on top can be drawn off.

When this white lead is dried, the next process will be that of mixing with oil and grinding ready for use, then placing in kegs for market. The capacity of the works is about five tons per day.

By the side of the building lies 60 or 70 barrels of linseed oil, said to be about one month's supply for the works.

The Motive Power

Consists of ample boiler power, and an engine of 80-horse power. In one corner of the building there stands a furnace for melting lead to be converted into pipe. By its side is a large hydraulic press, provided with reservoirs for hoisting molten lead, dies for various sizes of pipe, and all conveniences for forcing lead from the press in the form of pipe of any length or

size desired. This branch of manufacture will be put in operation after the white lead department is fully at work. There is also machinery for making sheet lead. The works will run day and night after starting, which will be within the next two or three days, and be lighted by eighteen electric lamps operated by a Brush machine.

The building is heated by steam pipes extending around the walls. Everything connected with the construction of the building, the machinery, and all its arrangements, is first-class, and especially designed for convenience and economy in operating. It will require a force of about twenty men to run the works, but at the present time there are more than double that number engaged. This new enterprise is destined to become one of the great industries of Utah, and will be the means of introducing the growth of flax and manufacture of linseed oil here, besides aiding in other industries.

About Wood.

Money in All the Timber.

Year by year the primeval forests of America are passing away. Already in many places timber and lumber are becoming scarce articles. In years past there has been great if not wanton waste of timber trees. In not a few sections people are planting forest trees, for the time is not distant when they will be needed. In felling the trees of our forest it should be the study of our people to waste no part of them. There are ways in which every part of almost every kind of tree can be utilized, and with the assistance of capital this can undoubtedly be done.

Near the town of Alta, across the Sierras, in California, they have started works by means of which they grind up the wood of certain timber trees and manufacture paper pulp. The same thing might be done on this side of the mountains. At Carson has been started a box factory. This is a good industry and will give employment to many workmen. But there are also other industries that might be started. This of the manufacture of wood pulp is one of them. All kinds of timber can be utilized in this industry. We do not say all kinds of wood will make first-class paper, but it can all be worked up into some useful article.

Not only is wood pulp made into paper, but it is also molded into barrels, casks, pails, bowls and all kinds of woodenware. In the East they are already making boxes, fancy and plain, cornices, picture frames and hundreds of small articles out of wood pulp. White woods, that have a long fiber, are used for the best kinds of paper; but almost every kind of wood can be ground up and put to use in making boxes, barrels and the like.

Only the non-resinous woods are adaptable for white paper, while the resinous woods serve well for colored paper, and for all kinds of woodenware. Thus these woods might be utilized for making boxes for berries, fruits and for many other uses.

When our people first began in the business of manufacturing wood pulp they used poplar, and for a time it was thought that only that wood, basswood, buckeye and a few similar kinds of wood could be ground into a proper pulp.

Now, however, machines have been built which turn out pulp with equal facility from all kinds of wood, different stones being required for different woods, however. The longest fiber is made from willow, basswood and poplar ranking next, respectively, in that regard. Cedar, fir and hemlock are said to work about alike, the latter working a little more freely. Maple has a fiber shorter than that of either spruce or pine, and is quite hard to grind. Birch is very hard and grinds very short. Poplar and buckeye pulps remain white for a considerable time, other woods changing color. Birch becomes pink, maple turns purple and basswood takes on a reddish hue. It is estimated that over 200 tons of wood pulp are now daily turned out in the United States.

The water power in our mountains might be utilized for grinding up such parts of the forest trees as cannot be profitably made into lumber. In this way the large branches and every part of a tree except the knots might be worked up into pulp and made into barrels, fruit and berry boxes, cornices and the like. No doubt the owners of the pulp mill at Alta will presently drift into this line as a means of profitably disposing of such pulp as will not make a good article of paper. Out of wood pulp may be made all such articles as are manufactured of *papier mache*; indeed it is the same thing. In molding articles it is only necessary to mix the pulp with size, glue, cement and other similar adhesive articles or preparations, owing to what use the thing manufactured is to be put to.—*Virginia Enterprise.*

THE Nevada Legislature has been wrestling with a bill intended to abolish the use of seals to legal documents. It is claimed that such things are out of date and of no earthly use.

THE proposed transfer of the Signal Service to the Interior Department is opposed by General Hansen, but favored by most of the observers.

A FOUR years' gas war in Los Angeles has been ended by an order of the City Council to the gas company to shut off all street lights, the electric light having been substituted.

MECHANICAL PROGRESS.

Steam Heating.

The recent railroad disaster at Tehachapi has attracted much attention among the mechanics to the practicality of a more extensive introduction of devices of heating by steam. In this connection it may be remarked that the city of Denver, in Colorado, has perhaps made more practical progress in this direction than any other city in the world. At least it is said that out of 27 steam heating works in the various cities of the United States, those at Denver are the only ones that have yet returned any dividends to the stockholders. These works are operated by a capital of \$150,000, mostly owned by Denver parties. The works consume 80 tons of coal per day. They consist of 15 horizontal, tubular boilers, 5x17 ft., and are enclosed in a brick building of two stories, neatly and substantially constructed. These boilers evaporate 10,000 gallons of water per day, which heat 40,000 square ft. of piping. There are laid in the streets about three miles of main pipe—from three to eight inches in diameter—and about one and a half miles of service pipe. Eight large blocks of buildings and several private residences are heated by these works. The works have enlarged during the past year by the addition of three boilers and about one-half mile of piping. Their success is one of the best evidences of Denver's prosperity, as well as of the enterprise of her citizens. The fact may be attributed not least to the liberality of Denver's citizens than to the ability, care and intelligence with which the works have been managed by the present Superintendent, Mr. William Ridley.

TO MELT BABBIT METAL.—Workmen who are accustomed to mixing or treating metals while in liquid state, will generally melt such metal upon a blacksmith's forge by applying heat so rapidly that the ladle will become red hot before the metal within begins to melt. When it is melted a dross rises to the surface, and it is skimmed off by the workmen and thrown away. The skimming process is kept up as long as the ladle is kept on the fire. Now, such a course is all wrong, because, by applying heat too suddenly, the metals which fuse at lower degrees of heat sweat out, and are burned before those which melt at a higher temperature become fluid. The dross, as it is commonly called, which rises to the surface, is in many cases the antimony, or hardening property of the alloy, and should not be thrown away. The surface of the melted metal should be kept covered with fine charcoal, which will prevent oxidation. A small lump of sal ammoniac should also be kept upon the surface of the metal. The metal should always be stirred before pouring, otherwise the heavier metals will separate and sink to the bottom of the ladle, and a constantly varying quality of metal will be the result. By melting the metal slowly and keeping it properly fluxed as described, it will run sharp, each casting will be uniform throughout, and the metal be of equal hardness. In observing these simple precautions, much of the dissatisfaction now experienced in using Babbitt and other anti-friction metals will disappear, and the metal not be condemned because it simply obeys the laws of nature and separates when improperly treated. —*Cotton, Wool and Iron.*

RESULTS OBTAINED IN PRACTICE.—The best automatic non-condensing engines furnish an indicated horse power for about three pounds of good coal, depending somewhat upon the fitness of the engine for the work and the quality of the coal. With a condenser attached a consumption as low as two pounds has been reported, but this is an exceptional result; two and a half pounds may be quoted as a good practice. The larger the engine the better the showing as compared with smaller engines. For ordinary slide valve engines the coal burned per indicated horse-power will vary from 9 to 12 lbs.; for the sake of illustration we will say 10 lbs., and that the engine is of such size as would require for a year's run \$3,000 worth of coal; now an ordinary adjustable cut-off engine with throttling governor ought to save at least half that amount of coal, or say \$1,500 per year; if the best automatic engine were employed, using two and a half pounds of coal per horse-power, a further saving of \$750 per year could be effected, or between the two extremes, \$2,250 per year in saving of coal without interfering in any way with the power, with the exception perhaps that the automatic engine will furnish a better power than the former engine. It is easy to see that it is true economy to buy the best engine and pay the extra cost of construction if the saving of fuel is an element entering into the question of selection.

OILING MACHINERY.—A great difficulty with all types in the use of machinery is the wasting of oil by its too profuse use. It often happens that a bearing will heat when supplied with too much oil that will run cool when supplied with the proper quantity. The reason is that when the lubricator is partly worn it becomes sticky; it resists removal; it remains tenaciously between the shaft and its bearings; whereas, too much of it, usually thin and limpid, serves to "wash the bearing," and let the parts into closer contact.

AMERICAN rail production in 1882 is estimated by Mr. James M. Swank, Secretary of the American Iron and Steel Association, to have been about 1,750,000 tons of 2,240 lbs. The production of steel rails he gives as about 1,500,000, against 1,210,284 tons in 1881, and of iron rails 250,000 tons, against 436,233 in 1881. In the latter part of the year scarcely any iron rails were rolled, the prices accepted for steel being probably less than the cost of manufacturing iron rails. The imports of rails during the year were probably just about 200,000 tons, so that we have a total of 1,950,000 tons provided for a year's consumption. This is about 10,000 tons more than last year, whereas we constructed at least 2,000 miles more of new road, which would require probably 200,000 tons of rails. But the consumption for second tracks, sidings and renewals this year was very likely less than in 1881. Though there was a great deal more road to maintain, a very large proportion of it was new, and most roads had been put into condition to carry more traffic than they could get to carry last year. The great increase in the capacity of the Bessemer works made in 1881 seems to have resulted in an increase of nearly 25% in their production, which was enough to lay 17,945 miles of track with 56-lbs. rails. This, by the way, can no longer be regarded as the standard American weight. Most of the old roads with heavy traffic use heavier rails for renewals, at least on their main lines, and several of the new roads also.

THE POWER REQUIRED TO SHEAR HOT STEEL BLOOMS.—Writing to *Stahl und Eisen*, Mr. R. Lauenstein, assistant chief engineer of the North Chicago Rolling Mill Co., gives calculations of the power required to shear hot steel blooms to length for a 30-ft. rail. The shear at the works named is driven by a 10x16 horizontal engine geared one to four and a half, the stroke of the shears being nine inches and the dimensions of the blooms six and three-fourths inches square. When the engine was running at a speed of 45 revolutions, the power is just sufficient to cut the blooms, the speed of the fly-wheel being sensibly affected. When the blooms were not quite hot enough, the engine stopped without entirely cutting through the bloom. This, therefore, proved to be the minimum limit of speed. From this Mr. Lauenstein calculates that the entire pressure upon the cutting tool of the shears was 125,120 lbs., or 2,746 lbs. per square inch of the bloom to be cut.

FIRE RESISTING WOODEN FLOORING.—Among the various plans now resorted to by English builders for rendering wooden flooring resistive to the action of fire, is that of constructing solid timber floors, composed of ordinary joists placed close to each other, and spiked or screwed at intervals with bolts; the latter are fixed alternately, and to form a key for the plastering angular grooves are cut under each joist, these grooves forming a series of dovetails. In a similar manner stairs are formed by a series of joists screwed or spiked together. With regard to partitions, preference is given by many to the French plan of constructing them with quarterings, filled in with rough stone rubble, then laid on each side with strong laths, and a coat of plaster applied and pressed through the vacuities from each side. In the construction of roofs the laying of solid concrete flat on iron joists, or iron joists fixed to the inclination of the roof, and then filled in with concrete on the French system, covered with asphalt, is a method highly approved. American builders may find these modes of construction worthy of imitation.

BENDING TUBES.—The common practice in bending copper tubes is to fill them with lead or resin, then bend them round a chuck, or something of the same radius as that required for the bend. The lead or resin may then be melted out. A machinist of Philadelphia some years ago devised an ingenious apparatus for this purpose, which, however, has not come into general use. It consists of a flexible mandrel of steel, made of wire of square cross-section, and with the coils lying in contact so as to form a close spiral. By inserting one of these of the right diameter into the tube, it can be bent to any angle without showing the slightest symptom of wrinkling; when properly bent the mandrel can be withdrawn by taking hold of one end of it and drawing on it, giving it at the same time a slight twist to lessen its diameter.

FINISHING SAWS.—A late improvement consists in tempering and straightening the saws at one operation. This is done by heating the saws to the proper degree, and then pressing them with a sudden and powerful stroke between two surfaces of cold iron. A drop press is employed for the purpose. The mechanism is quite simple and inexpensive. Its use is said to effect an important economy in the manufacture of nearly all kinds of saws, and improve their quality.

INCREASING THE STRENGTH OF IRON.—Two processes have been recently introduced by M. Sequin, of Paris, by which it is claimed that the resistance of iron to the various strains to which it is subjected is considerably increased. In one process the piece of iron is raised to a cherry-red heat and dipped in a mixture of sulphuric acid and water. In the other process the piece is similarly heated, and quenched in a mixture of one part of turpentine and six parts of water.

SCIENTIFIC PROGRESS.

Important Modifications in Electric Lighting.

If we may believe the reports which reach us on good authority, we are on the eve of important modifications in the system of general electric lighting. One invention, of which we have seen a full description, says the *Mechanical World*, makes it possible to avoid the use of expensive mains as conductors for the current by the adoption of a very simple arrangement. It may even avoid the necessity of using street mains altogether in some cases, and in all cases will render the means of distribution of current more certain and far less expensive than gas. We shall be able to give our readers the earliest full description of the new system. We have information of developments more surprising still which are now in process of elaboration, of which we are not yet at liberty to speak. Evidence sufficient is before us to warrant the supposition that that the cost of electric current will, within the next few months, be still further reduced, and that to so considerable an extent as to make it generally available as a source of power.

The *World* also states that as an instance of what may be done in regard to continuous electric lighting, it is worthy of note that recently the Edison Electric Lighting Company maintained the lamps on their Holborn Viaduct installation in constant glow from three o'clock on the previous Saturday afternoon until eight o'clock on Tuesday morning. The current is supplied by two large dynamos, driven alternately, the current being switched from one to the other five times during the prolonged run. There is no reason whatever, if the necessity should arise, to prevent the supply of current being continuous over an indefinite time, but this is the first occasion on which it has been required.

RAPID PURIFICATION OF SEWAGE.—A device which is said will solve the sewage question, has been devised and recently described in the *Chemical News*. It is closed with a water joint, and is said to be inodorous, and to render infection impossible. It is called a "Vidangense." "By a mysterious operation, which reveals a totally new principle, it transforms all the solid and liquid excreta which it receives, in a short time, and without the addition of any chemical agents, into a homogeneous liquid, scarcely turbid or colored, and almost inodorous, holding everything in suspension in the state of filaments or granules, almost invisible." The effluent which contains all the elements of the excreta, organic or inorganic, may be used for irrigation. Experiments made with a "vidangense" with glass slides are said to have proved that fecal matters introduced along with urine, soap suds, etc., are completely reduced at the end of 25 days (?). Light substances, such as paper, after having floated for a certain time, finally disappear and are dissolved in the liquid mass. A bladder adapted by means of a tube above the experimental vidangense does not swell out, but shrinks, showing that instead of liberation of gases there is absorption. All this is effected "without having recourse to any new agent or any strange force, but by the simple fact that the pan closed and filled with water brings into play a force of nature hitherto unforeseen and overlooked."

APOTROPIN.—Resci has obtained a new alkaloid from atropin, by heating so carefully with nitric acid that no nitrous acid vapors are given off, then rendering the solution alkaline with ammonia and extracting with chloroform. It contains one molecule water less than atropin, is difficultly soluble in water, easily so in alcohol, chloroform, carbon bisulphide, benzol, and amyl alcohol. Is distinguished from atropin by giving with an ammonia a violet color changing to a reddish brown. It has no effect on the pupils, but hypodermic injections produce slower action of the heart, and if taken internally in small doses, characteristic convulsions result, the symptoms of which, however, soon pass off. —*Arch. Pharm.*

NEW GREEN COLOR.—According to Ad. Carnot, a non-poisonous and permanent new green color may be prepared as follows: A solution of bichromate of potash is mixed with a sufficient amount of phosphate of soda; sodium acetate and sodium thiosulphate are added, and the slightly acidified mixture is boiled for an hour. A fine green precipitate is thrown down, which is not volatile, and is perfectly fast against air, light, dilute acids, soap, etc. It may be used for painting, calico printing, etc. For dyeing, the material to be dyed is treated with a mixture of bichromate, phosphate, and acetate of soda, and is then boiled in a slightly acidulated bath of thiosulphate of soda.

SEWAGE GAS ON METALS.—It has not been supposed that sewerage gas could exert any corroding influence on metals, yet investigations show that holes are actually worn in lead and zinc pipes by such gases. From all that appears, the gas which proceeds from the drain is the most dangerous element—exhalations of this character exercising their deadly influence both by perforating the pipes which contain them and then issuing through these apertures to mingle with the respired air. Substantial iron pipes, well ventilated and joined in the most perfect manner possible, are considered the best protection.

Something Novel in Ballooning.

New light has been thrown on the construction and management of balloons by an experiment this week which shows the way how an important change in aerial navigation may be effected. Hitherto it has been considered that gas only is suitable for their inflation, for the old-fashioned fire balloon, which acquired its ascending power by the rarefied air produced by a furnace of burning straw at the neck or lower part of the balloon, was too dangerous for practical purposes. If a balloon could be constructed of some nonflammable material, all the difficulties of ascent by means of rarefied air would be overcome, and balloon ascents, whether for scientific or warlike purposes, would be practically useful. Asbestos it seems is the substance that may be made available for the purpose, for experiments which took place last Tuesday at Hendon proved that it is the material to be used.

A balloon had been constructed, the whole of the lower part of which is of very fine asbestos cloth, while the other portion, which is of canvas, is covered with a fire-proof solution. The balloon is of a cylindrical shape, having a deep zone at the equator, its holding capacity being about 3,000 ft. Attached to the neck is a copper spirit lamp. Before inflation the balloon, which hangs like a limp rag, was suspended by a line supported by two poles or uprights. The spirit having been ignited, the inflation at once commenced, and the rapidity with which it was concluded excited the surprise and admiration of all present. Everyone knows that the inflation of an ordinary balloon with gas, even with every facility for filling it, is a work of several hours. In the present case the balloon, which, though only a model, is very nearly as large as an ordinary one, standing some 30 ft., was completely distended within five minutes, at the end of which time it was ready to ascend. This is an advantage which cannot be overrated, but it is not the only one.

The difference in expense between the gas required in the one instance and the spirit in the other is very considerable indeed, while the impossibility of carrying about sufficient gas as compared with the facility for taking everywhere as much spirit as may be required for an endless number of ascents, must strike the minds of those who desire to make ballooning a practical science. The greatest value, however, which the new balloon possesses is that it may be easily carried about by an army operating in the field, and sent up aloft at a minute's notice, so to say—an advantage which will be fully appreciated by commanders of armies. —*Iron (London), December 24th.*

Impurities in Copper.

Much difficulty was recently experienced by a New York refinery in its attempts to refine a quantity of Colorado copper. The refiners pronounced it as so full of arsenic antimony that their furnaces were, as they said, "poisoned," and rendered unfit for refining. Samples of this copper were subsequently carefully examined, but merely traces of arsenic antimony were found, not enough to produce the deleterious effect noticed. Other samples were more carefully analyzed, when the impurity was found to be tellurium, a substance not heretofore found in copper anywhere. The amount of tellurium found was very small—in the matte .12; in black copper, .097; in refined copper, .083%. It is somewhat uncertain whether the tellurium was derived from the ores of the copper or from the ores of gold, silver, lead, etc., which accompany the copper. Tellurium, it is well known, is becoming more and more generally found all through Colorado, and associated with almost every variety of ore. The effects of even a very small fraction of a single percent in the refined copper is found to be very deleterious, causing cracks in the process of rolling. The assayer to whom the examination was entrusted says in his report: "This is the first time, so far as I know, that the presence of tellurium has been detected in commercial copper. But very little of it is removed in the treatment, as the four analyses show. It is surprising how very small a quantity renders the copper red-short, and consequently worthless for rolling."

PHOTOGRAPHIC COLOR PRINTING.—M. Albert's process for rendering natural colors in a picture, by means of a peculiarly constructed photographic steam press, has attracted much attention in Vienna, the principle consisting in the analysis of the white light into the three colors, yellow, blue and red, and in the recovery of the three colors ready for the press. On a plate chemically prepared so as to receive but the yellow parts of the light, and the tones of the colors of the object to be reflected, the first photograph is taken, when a negative of that plate is at once put under the press, the cylinder of which is dabbed over with yellow paint. None but the tones of the yellow colors are now seen in this impression. After that the object is photographed on the plate made to reflect but the blue colors; this plate now under the press reflects a blue impression, the cylinder being dabbed over with blue paint. In the same manner the tones of the red colors are provided for by means of a third plate. By printing the individual pictures of the yellow, blue and red over each other, the colors intervene in the production of the picture.

MINING SUMMARY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

THE Sutter Farmer says: George Baker, a Feather river fisherman, one night last week trapped five heavers in the lake back of the old Riggs place, which is just below the Briggs orchard in this county.

Adjoining the Greeley-Blackman is the Great Western, a mine lately bonded by Capt. Treglone, and run in the interests of an English company. A tunnel is being driven into the hill, and it discloses a fine ledge. Immediately opposite the Great Western and also upon the opposite side of the creek, is the Imperial, about which so much has been said and

upon the success or failure of which greatly depends the fate of that district. There are big hopes centered in the Imperial, and all appearances in and about the mine fully justify those hopes. The 10-stamp mill has just been completed, and was built by Mr. James Oliver, late of Sierra City. It is a neat and compact arrangement and is well calculated to save gold. Silver and copper plates will be used, and at the end of them are long and deep boxes with riffles to save the sulphurets. The mill will be run by water, for which a 4-foot Collins wheel will be used. The pipe and everything is all in place and is in complete order. It was expected that the mill would start regularly to work yesterday, but the ditch was completely frozen and not a drop of water could be had at the mine. There is 160-foot pressure at the mine, which is sufficient to drive all the stamps that it will ever be necessary to put in motion at the mine. On the dump there is about 350 tons of ore awaiting the mill, and ore is being hoisted from the mine at the rate of 35 tons per 24 hours, a tub being used for that purpose. There is but little waste rock coming from the mine. It is no exaggeration when we say that the rock on the dump is as lively in appearance as any we have ever seen in this district, and if it does not yield well it will be a surprise to every one who has seen it. The shaft on the Imperial is 160 ft deep, and is sunk on an angle of about 75 degrees. The first level has been started at the bottom of the shaft, and is in a distance of 60 ft. The ledge has increased from 5 ft in thickness to that of 7 ft, and looks well—a great deal better than the most enthusiastic shareholder in the mine expected to see it look at that depth. The ledge increases in size as it is opened up in the east drift. It is estimated that, when the mine is opened, \$4 per ton will be amply enough money to mine and mill the rock. The work in the mine is ably directed by Mr. John Sowden, who has been an underground miner nearly all his life. Four men are employed underground, and can easily keep the ten stamps supplied night and day. The mill will crush about 18 tons of ore every 24 hours, and the owners are anxiously awaiting water so that they may start the mill, and see what their mine is going to be. If indications go for anything, the Imperial has a bright future.

PLUMAS.

EMERALD DISTRICT.—Greenville *Bulletin*, Jan. 27: The Lucky S. company are continuing to prospect two of their claims. On Lucky S. No. 1 they have sunk 50 ft on the ledge, and at this depth the vein is only 18 inches wide, but that is double what it is at the surface, and the increase in width continues as the depth increases. A tunnel is now being run that will strike the ledge at a depth of 130 ft, and at that point the company are confident of finding a good wide ledge. On Lucky S. No. 2 a shaft was also sunk on the ledge, and the developments there were sufficiently encouraging to induce the company to put in a tunnel similar to that on the other claim. This tunnel is now near the ledge and all the indications favor the belief that a valuable mine will be developed there.

THE RESERVOIR.—The water in the Round Valley reservoir is now getting low; the supply may not last over a week or two when of necessity all the mills depending upon it for their power would be forced to stop. This is the second season in succession diffling altogether from any within the memory of the white settlers. While heavy storms have been raging in the East week after week, not a cloud was to be seen in our skies; now there is indication of approaching storm, and any day we may have such a downpour as will set the streams booming again.

SAN BERNARDINO.

CALICO NOTES.—Calico *Print*, Jan. 26: Work has been resumed on the Cuba No. 1 mine. Four men are at work opening a cut in the west end; the showing is good. There are about 8 tons of ore on the dump. Fourteen tons have already been milled at the Pioneer mill at Howley's.

Adjoining the Cuba No. 1 is La Belle, owned by a Los Angeles company, Messrs. Freeman & Maxwell. The character of the ore in this claim is similar to that of the Cuba No. 1, and judging from present appearances it will yield as rich returns as the latter.

LAST CHANCE.—Last Tuesday Mr. F. O. Wilkinson, foreman of the three mines, La Belle, Loma de Plata and Last Chance, owned by Messrs. Freeman & Maxwell, called at our office, and from him we gain the following information: There are 9 men at work on the 3 above mentioned claims, most of them working on the Last Chance. This mine continues to show up fine. A tunnel has been run in 60 ft, a crosscut 20 ft, and they are about ready to sink a perpendicular shaft on the ledge. A large quantity of ore was taken to Sherman's mill, which returned \$99 to the ton. It is the intention of Messrs. Freeman & Maxwell to put up a 10-stamp mill in about a month, as they are satisfied their mines will amply pay them to do so. Mr. Wilkinson went to Los Angeles last Thursday to see about matters relating to the mill project. When he returns he will ship several tons of average ore to San Francisco to test its value.

BLACKFOOT.—Vinton L. Mitchell has bought a two-third interest in the promising claim, Messrs. Taggart & Sinclair owning the remaining one-third. Five men are at work taking out from 6 to 8 sacks of fine ore daily. Some ore was shipped to the Pioneer mill last week, and the returns from the same were good.

SILVER ODESSA.—The lumber for the chute to be erected at this mine is on the ground, and the work of constructing the same will be commenced in a few days. There is a force of 7 men under the employ of the company engaged in finishing the grading of the road that leads up the canyon to the mine. When that work is completed the men will be put to work on the mine.

SILVER KING.—We paid a visit to the office of Messrs. Johnson & Markham, who have leased the Silver King, for the purpose of learning the progress of the mine. From what we could learn from Mr. Barber we can say that the mine is doing very well. Ten tons of ore that averages well is being taken out daily, and after the necessary preparations twice that quantity will be taken out in a few weeks. The company are about to let the contract for hauling the ore to the Oro Grande mill. There are five levels opened in the mine. The first is called the west end level and is 92 ft from the apex of the vein. From this level to the next lower one, the winze level, it is 95 ft, thence to the next below, the upper tunnel level, 50 ft, thence to the east end level 55 ft, and

92 ft from thence to the lower tunnel level. The distance from the apex of the vein to the floor of the lower level is 375 ft. Five tunnels and two drifts have been cut into the mountains. The west end tunnel is in 141 ft, the east end 67 ft, south branch of east end 18 ft, winze level 65 ft, lower 172 ft. The upper tunnel west drift is in 150 ft from the main tunnel, and the upper tunnel east drift is 92 ft from main tunnel. There are several winzes and a perpendicular shaft of about 90 ft. There are two substantial shutters for conveying the ore to the large bin below, and a force of men will be put on in a few days to finish the road so that it will be easier hauling ore for the same. Two shops are kept busy sharpening tools and repairing machinery.

BISMARCK.—This mine continues to show up fine. There are 6 men at work on the same, taking out about 8 sacks a day of ore that assays high. It is transported to the wagon road on burros. Forty tons of ore have been taken to the Oro Grande mill, and another shipment is about ready for the mill.

SIERRA.

GOOD GRAVEL.—*Mountain Messenger*, Jan. 27: Mr. Gilligan, of the City of Six, has at last found good gravel in his claim at that place. He has been running west, under the large flat, where no prospecting has ever been done before, and the gravel he has struck looks and prospects well, and there are indications of a large body of it ahead. W. L. Campbell has been up at the Black Jack mine doing the annual work upon the claim. He reports that he has discovered the ledge in the lower tunnel. We always believed the property was valuable, but that it had not been properly managed. The Blue Gravel mine, above Sierra City, is showing good indications. The tunnel is now in broken material, and they are confident of striking gravel soon.

Nevada.

WASHOE DISTRICT.

SIERRA NEVADA.—*Enterprise*, Jan. 27: The east crosscut on the 2700 level is still following the east and west quartz deposit or "cross-course," and it is expected that in a few days it will encounter a vein running north and south, as it is doubtless a cross-fissure between two north and south fissures. At its intersection with a north and south vein a considerable amount of quartz will doubtless be found, and probably some ore.

HALE AND NORCROSS.—The drift north on the 2600 level joint with Savage has reached a vein porphyry which contains streaks of excellent ore, the assays running over \$100. According to the best information obtainable one of these streaks has a width of 15 inches. The indications are that these strong seams of ore are the feeders of an ore body of value, one side or the other of the drift. The point where this ore has been found is near the middle of the Hale and Norcross ground.

UNION CON.—The joint Mexican east crosscut on the 2900 level is beginning to show a good deal of quartz, and this quartz is now yielding low assays. The quartz appears to be increasing in quantity and improving in quality in going eastward.

OPHIR.—The station at the 3100 level of the joint Mexican winze will be completed this week, and next week an east crosscut will be started. The station is being cut out in the porphyry horse, which consists of the same material at this point as was shown where it was cut through by the winze. In a few days mining men will be closely watching the work at this point—the deepest mining on the American continent.

MEXICAN.—Excellent progress is making in cutting out the station at the 3100 level of the joint Ophir shaft. The station will be finished this week, and next week a crosscut will be started eastward across the vein.

SAVAGE.—The north drift joint with Hale and Norcross, on the 2600 level, is making good progress. It is now about the middle of the Hale and Norcross ground, and is in material containing streaks of ore of excellent quality, seemingly indicating that there is in the vicinity an ore body of importance, of which these ore seams are the feeders. The assays run up to over \$100.

POTOSI.—Good progress is making in the south drift on the 2600 level, and the material is such as gives promise of ore at some point ahead, or in the vein when crosscuts are run. They are now running more to the west than formerly, which takes them deeper into the vein, which appears to be swinging out to the east.

YELLOW JACKET.—The old upper levels continue to yield 60 tons and over of very fair milling ore daily. A considerable amount of prospecting work is in progress.

UNION.—Good headway is being made in the work of changing the pumps. About half (500 ft) of the new road is in position. The 1,000 ft of new road which is being put in from the surface down is 18 inches square. In about two weeks the new pumps will be in operation.

CON. VIRGINIA.—All is going on about as usual. There is no change worthy of note at any point. The water, however, is gradually draining on the 2500 level through the drift that runs out toward the Best and Belcher and Gould and Curry.

COLUMBUS DISTRICT.

NORTHERN BELLE.—*True Fissure*, Jan. 27: Excellent progress is being made in sinking the main winze from the fifth shaft level, the distance made during the week being 16 ft. The total depth on an incline is now 108 ft, and it is expected that a perpendicular depth of 100 ft will be reached at the close of the coming week. When this is accomplished crosscutting will be commenced. Crosscut No. 2, on the same level, is in a distance of 19 ft, and shows a formation of decomposed quartz in the face. Stopping on the fourth shaft level is now in progress, the vein showing a width of 20 inches of excellent ore. The outlook is very promising on the second intermediate shaft level. The west stop is showing 50 ft in length of ore, varying from 1 to 3 ft in width. There is no decrease either in the quality or quantity of ore in the stopes above the first shaft level, the production being as usual. The other shaft levels present about the same appearance as last week.

The usual amount of work is being done on the levels above the adit, and with very satisfactory results. The new development on the ninth level is an important one, being in ground heretofore unprospected. This body of ore has been developed a distance of 14 ft, and is now showing a vein 4 ft in width of fine grade ore. About 67 tons of ore are being extracted daily, and sent to mill No. 2, which is running smoothly and continues to do good. The shipments of bullion amounted to \$17,959.09 for the week ending on the 25th inst., the total on January account to the same date being \$56,270.

MOUNT DIABLO.—The stopes above the drift connecting winzes Nos. 1 and 2 does not show quite so well as at the date of last report. The ore in the stopes above winze No. 4 is not looking so well as last week, being narrower and more mixed with waste. It averages \$120 per ton. Some \$70 quartz is being taken from the raise near the shaft on the second level. The stopes above the west drift from the Callison winze is turning out some \$80 ore from several seams in a wide ledge.

COLUMBIA'S CON.—The raise from the east drift on the second level is now 23 ft in length. It still remains in the body of ore which it has been following, and continues to give assays of a quality as good as when first encountered. The raise from the west drift, on the first level, is now up a distance of 30 ft, and is showing 18 inches of ore, which gives average assays of \$100 per ton.

EUREKA DISTRICT.

A STRIKE.—*Sentinel*, Jan. 28: We were shown yesterday a piece of very fine rock from the Kitty tunnel. It is rich in black metal, and will probably go \$150 per ton. The tunnel, owned by Col. E. N. Robinson, is being worked by a force of 6 miners, on two 10-hour shifts. It is in 600 ft. A seam had been followed on an apraise, but the ground not looking favorable, the upraise was temporarily abandoned, and the seam was followed downward below the tunnel level. In sinking a ledge of mineralized rock was uncovered, in which a small seam from 2 to 3 inches of the ore mentioned was discovered. It is a flattering prospect.

TUSCARORA DISTRICT.

TUSCARORA TUNNEL.—*Times-Review*, Jan. 24: The ore from the Tuscarora tunnel, extracted from the west crosscut, after being very carefully assorted, and including much which should never have seen the stamps, returned \$149.50 per ton. This result is regarded as indicative of the richness of the ledge, which sooner or later will be reached. Scientific men who have examined the ground have come to the conclusion that the vein, when struck, will be a contact vein lying between the wall rocks of syenite and porphyry. The porphyry will be found on the north-west side. Numerous stringers are encountered, and a formation, as such resembling the Comstock formation as the Comstock itself, is found at the breast of the main tunnel.

NORTH BELLE ISLE.—*Times-Review*, Jan. 25: The shaft has been sunk 11 ft, making a total depth of 317 ft. No change in formation.

NAVAJO.—During the past week the shaft has been sunk 10 ft. Winze No. 2 has been sunk 18 ft, showing well at the bottom. The stopes are producing the regular quantity and grade of ore.

BELLE ISLE.—During the past week the north drift has been advanced 22 ft, and still shows seams of good ore. The winze has been sunk 27 ft, with no change in formation or general appearance.

ARGENTA.—Crosscut has reached the hanging wall. Total distance between walls 54 ft. There is a streak of good ore on the hanging wall. A drift is being run west in it, and it is improving as it is extended. The east drift on the 700 level of the Grand Prize will soon reach the Argenta ground, and when it does the work of opening up the ground between the 600 and 700 levels will be rapidly pushed ahead.

ELKO CON.—The ledge continues to show a marked improvement in the quality of ore. Assays from the ledge give a result of \$91.66 in silver and \$101.29 in gold. Total, \$192.95 per ton. The ledge is from 3 to 5 inches in width, with every indication for its widening.

GRAND PRIZE.—A winze has been started 125 ft west of the shaft below the 600 level. The ledge is strong and producing some high-grade ore. The north crosscut in the 700 level is cutting into some good quartz. Machinery all working well, and no trouble with the water.

Colorado.

RICO.—*Rocky Mountain Mining Review*, Jan. 29: The latest "rich strike" is reported from Rico. It is claimed that ore running away up into the thousands has been found in quantities. If this is true, and the ore body is a large and permanent one, a demonstration will soon follow. It will be well, however, for miners and prospectors to wait until something more authentic is heard from that section before rushing in there.

HUKILL.—*Georgetown Gazette*, Jan. 26: The Hukill company has been reorganized during the past few weeks, and steps have been taken to relieve it from its indebtedness. A competent man is to be sent out to look after the company's interests and resume work. Hukill stock has risen from 8 to 19 cents.

THE EMPIRE CITY.—This old mine (Suttle & Moore) has exposed a body of ore some 10 inches in width and about 50 ft in length. In the old drift, now in some 300 ft, the ore was meager and scattered. A raise was begun, which resulted as above. The ore mills about 5 ozs gold per ton. Six men are at work driving the drift ahead and stopping.

ORE.—A carload of ore for a test run has been shipped this week to Argo for the Upper Union Tunnel Company, by Johnson & Swanson, from the Cashier mine at Empire. The ore consists mainly of iron pyrites and surface quartz. The mill-runs of the solid ore are from 5½ to 9½ ozs gold per ton. This ore was taken out in four and one-half days by 5 men, and amounts to 5 tons.

THE VIRGINIA CITY.—At this mine, on Lincoln mountain, work has been prosecuted with activity by the leasers, Messrs. Richardson & Co., who are now in a fine body of ore. The drift has been opened up for some 130 ft, 80 of which was in ore. At the present writing they are sinking a shaft in ore, and are now 25 ft below the drift level. The ore is from 10 to 18 inches in width, and nulls 285 ozs per ton. The shaft is to be sunk 100 ft, when a drift east and west will be started.

New Mexico.

BURRO MINING DISTRICT.—*New Southwest*, Jan. 18: The Boston Syndicate are the fortunate owners of nearly 50 mining claims in this district, upon which they have had employed and are employing a large force of men doing the assessment work. In nearly every direction the mountain sides are dotted with ore dumps, which have considerably augmented within the past few weeks,

Arizona.

BISBEE.—*Cor. Tombstone Republican*, Jan. 26: The machinery for the new hoisting works of the Copper Queen has all arrived. The boilers are already in place, and the masons are walling them in. The engine, which is a 10x14 double cylinder, arrived yesterday, and will be set up as soon as possible, so as to commence sinking on the incline for the next level, which is expected to expose a bonanza of cuprite (red oxide) and native copper, as the bottom of the third level is in such ore. Another No. 10 Cameron pump has arrived, which is to be used in sinking. A tramway is being built from the road up to the hoisting works, where an engine will be placed for hoisting up timber, wood and supplies for the mine, which will be quite a saving to the company, as it was formerly hauled up the hill with animals. The work that has been done on the Mammoth has shown up well, as there is about 70 tons of good copper ore on the dumps, and more in sight.

THE COPPEROPOLIS.—This mine has temporarily shut down, but it is reported that they are going to put up a hoisting engine and pump, as they have struck water at 90 ft.

THE DELLA MACK.—This mine, with the last work, is showing fine, as they have about 2½ ft of very rich ore in the bottom.

PROSPECTING.—There is considerable prospecting being done out at Solomon Springs. Some prospectors brought in some float which assayed over \$700 in silver and 50 per cent. copper. Mr. Charles Young has a lease on the New El Dorado mine, in which there is very rich silver ore. He is to sink 50 ft and drift the same. There is ore there that assays several thousand dollars a ton. The gangue of the ore is quartz, carrying chloride and horn silver. The Copper Bullion mine is being developed, and has a good showing of carbonate of copper. Taking things in general, Bisbee is looking encouraging.

Idaho.

MORE MACHINERY FOR WOOD RIVER.—*Wood River Times*, Jan. 26: Mr. Marsh, of Galena, left today via Blackfoot for New York City. He will meet Major Stafford at Chicago. These gentlemen are interested in the mines near Galena known as the Galena group. They will immediately contract for and ship to the mines sampling works, machinery complete, and concentrators to operate with the sampling works; also pumps and hoisting gear. The machinery will come by way of the Oregon Short Line and Naples. Mr. Marsh will return to the mines in March.

THE ONTARIO ORE BODY AGAIN CUT.—The ore body of the Ontario mine, on Warm Springs creek, was again cut last week in the drift.

Montana.

PONY.—*Cor. Butte Miner*, Jan. 27: Judging from the flattering reports coming from the mines near here, Pony is soon to have a boom. She started at a lively gait, was "downed" on the turn, but is coming back on the home stretch with flying colors; so it's a kind of boomerang after all. A number of men are engaged in extracting ore from the different mines. Much of the ore is base, particularly in the Boss Tweed and Willow Creek lodes. The crevice of the former lode is 30 ft, wide while that of the latter is from 5 to 8 ft in width. The Ned has free milling ore and a 3 foot vein. One hundred thousand dollars is the estimated amount in sight in the mine, besides a large dump on hand. The ore averages \$55 per ton in gold. The White Pine is worked to a depth of 130 ft, and has now on the dump about 400 tons of \$50 rock. The dump is daily increasing. The Custer lode, a half-mile east of town, has been opened to a depth of 25 ft. It shows a fine vein 5 ft wide, with an ore body of rather low grade, but which no doubt will pay well for working. Many other good mines in the camp are being developed more or less according to the means of the owners. Henry Elling is erecting a 20-stamp mill at the upper end of town in which he intends to place concentrators, to treat the base ore, which assays well. The merchants and mechanics here are doing a good business.

Oregon.

NOTES.—*Jacksonville Times*, Jan. 26: The miners are having hard luck, as the water is very late in starting. Klipple & Keaton this week received a giant, which will be used at their claim on Poor-man's creek. Since the weather has moderated, the miners feel more encouraged and expect to make a good run yet. R. W. Derickson, of Horsehead, was in town this week. He says that some excellent quartz is being taken out there and that the mill is now operated with success. Cold weather has been the order in Josephine county as well as here. In fact it has been so cold that Wimer & Simmons' mine, which generally runs right along, was frozen up for several days. Capt. Kelly came up from Cayote creek Saturday after supplies. He informs us that he had enough water to clean up with until the cold snap put an end to operations, which were resumed this week. Dr. Reynolds informs us that he has received favorable assays from the ore he sent to Chicago. He claims that one of the richest mineral belts on the coast is located on Evans creek. Coal and petroleum also seem quite abundant.

Utah.

PARK CITY.—*Salt Lake Tribune*, Jan. 28: It is rumored that a rich vein of ore has been struck in the Washakie. Admission has been denied to all not directly connected with the mine. We were shown some very fine specimens of the ore yesterday which will assay very good. Col. Wm. M. Ferry is doing Salt Lake this week. His tunnel at the Apex mine is being extended at a rapid rate. The Apex will, no doubt, rank with the best mining properties in its vicinity, every indication going to show that there is a mine which will prove a paying one when fully developed.

Complimentary Sample Copies

of this paper are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage; and as far as practicable aid in circulating the journal and making its value more widely known to others and extending its influence in the cause it faithfully serves.

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Steel-Iron.

The question of producing a metal possessing the physical properties of both iron and steel has for some time past received attention at the hands of practical metallurgists and others. One of the latest workers in this direction is Professor M. Keil, who has succeeded in producing a compound metal which is stated to possess the characteristics of both metals. The Professor, in giving his experiences on the subject, states that the difficulties can be obviated only if the two materials can be intimately united into a whole. After many experiments, success has, it is claimed, at last attended them, and a material has been produced answering every requirement, and to which the name of "steel-iron" has been given. The following five descriptions have been made: (1) Steel by the side of iron; (2) steel between two layers of iron; (3) iron between two layers of steel; (4) the core of steel, the surrounding shell of iron; (5) the core of iron, the surrounding shell of steel. This steel-iron is manufactured in the following manner: A cast iron mold is divided into two parts by a thin sheet of iron securely fixed in it. The fluid steel, as well as the fluid wrought iron, which have been freed before smelting from substances preventing welding, are poured at the same time, and in the same quantity, into this doubled mold; the separating plates serving as the medium welding both parts, steel and iron, completely together, so that they form an inseparable whole. The plate serves as a separator and a welding agent at the same time. The success of the operation depends upon the quality and the thickness of the plate. The latter must be of a certain thickness, to prevent the two glowing and liquid masses burning through it; and it must not be too thick, so that they are able to bring it up to welding point while rising in the mold. The dimensions of the plates depend upon experience, and, naturally, are regulated by the dimensions of the castings. The manufacture of the above-mentioned five kinds are the same in principle. In numbers two and three, however, the mold is divided into three equal parts by two strips of plate; in numbers four and five the core is formed by a sheet iron pipe standing in the middle of the mold. It is stated by Professor Keil that the product thus obtained may be used for a great many purposes. Steel upon iron will be useful for rails, armour-plates and anvils, the hard steel face reducing wear and tear, and also, as in the case of thief-proof safes and armour plates, withstanding the attacks of even the hardest drill, while the iron prevents cracking consequent upon heavy blows. Parts of machinery and tools which are subject to powerful pressure, and are exposed at the same time to great vibration, are best made of the material with tough core and hard surface. The wear and tear would be slight, while the soft core imparts considerable strength and prevents fractures. From what has been said respecting the quality of this description of steel iron, it will be seen that the extent of its application promises to be a wide one, partly on account of its undoubted excellence, partly also on account of its many qualities, because it may be used for a great variety of manufactures.—*Iron*.

The Bonanza King Mine.

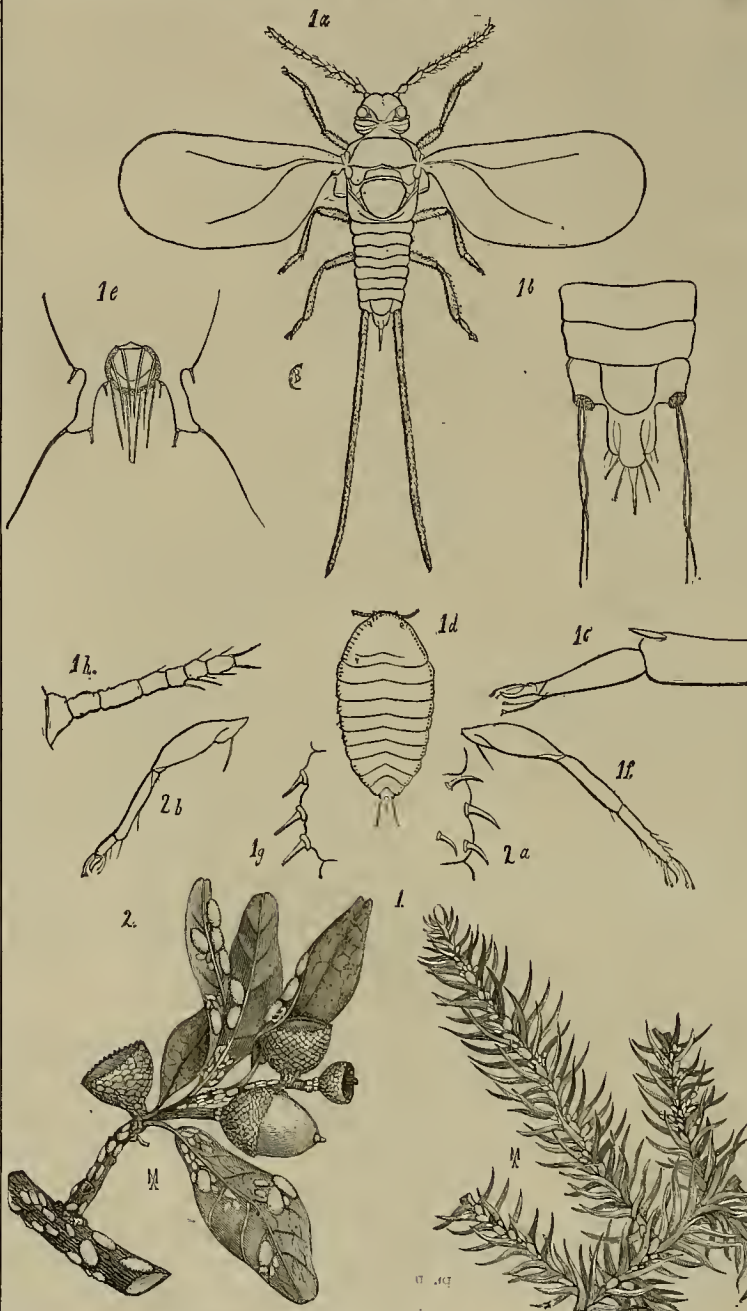
A few days since we published the gist of a telegram from Mr. Ewing, of the Bonanza King mine, at Providence, to the effect that the company had shipped \$11,000 of fine bullion for the first eight days' run. The operator in transmitting the message omitted part of it, and the fact is, that instead of \$11,000 the amount shipped was 11 bars, the value of which was \$19,000. This is the first work of the new mill, and certainly is a most encouraging starter. The Bonanza King Company have spent an immense amount of money in developing their mines, and to-day have undoubtedly the best mining property on the coast. The new mill was shipped by mule teams from Mohave station. Even while the railroad was building to the mines with a prospect of reaching them in a short time, yet they considered that the delay of a few weeks in waiting for the railroad would cost more than the extra amount for freight, large as it was, and with genuine mining enterprise hauled all their machinery over more than two hundred miles of desert, and will have saved the extra cost in a few days' run. The question of water supply was also a mooted one, but by vigorous prospecting and extensive work sufficient water has been developed to settle this question, and enough is assured both for household and mill purposes.

The Bonanza King is already the mine of our county. Its output in the short time it has been worked is very large, and the ore of high grade; immense amounts have accumulated on the dump, sufficient to insure the continuous working of the mill if it is found necessary to do any dead work, while at present more than sufficient ore is being taken out to keep the mill employed to its capacity. We are pleased to see the grit and enterprise of this company so well rewarded, and hope, for their sake and the prosperity of the county, that they may continue to ship \$20,000 in fine bullion every eight days for years to come. Nor is this extravagant when we consider what other mining property will do and is doing, and the indications are that the Bonanza King is not a whit behind the best, and that its fortunate owners may reap a rich harvest for their immense outlay of capital in its purchase and development.—*San Bernardino Times*.

Scale on Ornamental Trees.

It may interest many of our readers to know something of a pest which attacks that splendid ornamental tree, the Norfolk Island Pine (*Aracariae Excelsa*). This tree is quite a favorite for garden and park planting in this State, and its peerless symmetry is a continual joy to the beholders. During Prof. J. Henry Comstock's late visit to this coast he found a scale insect preying upon this tree, and in his report to the Department of Agriculture gives a drawing and a description of it. These we produce herewith. The insect was found on a tree in southern California. It is called the Norfolk Island pine coccus (*Eriococcus aracariae*), and was first described in the proceedings of the New Zealand Institute.

When a tree is badly infested with this pest



SCALE INSECTS ON NORFOLK ISLAND PINE AND OAK

it becomes blackened with a black fungus, which is *Fumago salicina*, which accompanies coccids on orange and other trees. This is often the first indication of the presence of the insect which is observed. But when an infested tree is carefully examined numerous white cocoon-like sacs containing the full-grown insects may be seen closely applied to the sides or bases of the leaves. Frequently these sacs are so massed at the ends of the twigs that the bases of the leaves are completely covered. The immature insects are not so easily seen with the unaided eye, as they differ but little in color from the tree. They are greenish yellow, and are usually to be found in the angles formed by the bases of the leaves. The larvae of both sexes and the adult females are similar in form (see Plate, Fig. 1d). The posterior end of the body is furnished with two prominent lobes, each terminated by a long hair. Between these lobes there is a conical mass of white waxy matter projecting backwards. The margin of the body is fringed with a row of tubular spinnerets. These spinnerets are more numerous on the adult female than on the larva. In both stages each one is covered with waxy matter, which often extends beyond the end of the spinneret. Excepting these filaments and the caudal tuft, but little excretory matter is to be seen, so that,

although the insect resembles a mealy bug in the form of its body, it differs greatly in appearance. The female, when full grown, measures .09 inch in length. When the female is ready to lay her eggs she excretes a cocoon-like covering to the body, composed of white waxy threads (Fig. 1). This sac is dense like felt, but easily torn. It is open on the middle line of the ventral surface, or very much more delicate on that part. It adheres to the tree quite firmly, remaining where excreted after the death of the insect. As the eggs are laid the body of the female shrinks away, making room for them, and finally it becomes a very small pellet in the anterior end of the sac, the remainder of the space being filled with eggs. These are light yellow in color. When the male larva is ready to undergo his metamorphoses he secretes a covering to his body resembling the sac excreted by the female, except that it is very much smaller, measuring only .05 inch in length (Fig. 1). From this sac the adult insect emerges

The Paradise Mines.

A Promising Camp.

The *Virginia Enterprise* is indebted to J. V. McCurdy, from Paradise Valley, for the following items in regard to the mines of that section:

The Live Yankee.

Which is being developed by Messrs. Nick Fryer and A. J. Shepard, of Winnemucca, has heretofore, near the surface, produced very rich ore and of a very free milling character. They are driving a tunnel to tap the ledge at much greater depth and to drain the water encountered in their shaft. The tunnel is now entering the lead, and will soon enable them to open and work the vein to advantage.

The Paradise Valley Mining Company

Have not worked their property the past two years. The vein is parallel with the Wild Goose and Live Yankee, and is a very strong and well defined ledge, and has produced many thousands of dollars in bullion. The vein crops out on the face of the mountain, and four tunnels have been driven in on the ledge from 200 feet to over 400 feet, the lowest one of which prospects the vein about 400 feet below the surface. The Paradise have a first-class dry-crushing ten-stamp mill, with White & Howell improved furnace.

The mill is about five miles from the mine on Martin creek, and is constructed to use either or both steam and water power. There is, however sufficient water to run all the machinery by changing the wheel to hydraulic pressure instead of a suction stem. At the time the Paradise people were operating, the opinion prevailed that it was absolutely necessary to roast or chloridize all their ores, and nothing under \$50 per ton would pay to handle, but by working several hundred tons of the ore from the waste dumps the past summer at the Bullion mine the wet process demonstrates that it can be worked to nearly as high a percentage as the Comstock ores.

The Wild Goose

Is a very promising property and shows a large deposit of good milling and profitable ore. The Wild Goose is owned by merchants, stock men and farmers, who have obtained the stock through business channels, and not being mining men fear (from examples set them) to risk a dollar in developing or working the mine.

The Bullion Mine.

Adjoining the Wild Goose, has been worked (or gonged) more constantly than any mine in the district; yet the deepest point penetrated is but about 200 feet below the surface, and no prospecting was done at that point. Originally the Bullion was worked through an open cut, some 20 to 60 feet deep, following the vein into the mountain. A tunnel was run from the mountain at right angles to the vein, and tapped the same about 65 feet below the upper workings. A drift was then run north in the vein some 400 feet to the Wild Goose line, showing several bunches of ore, none of which have been prospected, except one chimney about 60 feet in length, which is near the Wild Goose line. It is from three to four feet wide in the drift, but in rising up the vein has widened to about nine feet. Six feet are base in iron, sulphur and a little antimony, and the other three feet of the vein, on the hanging wall, contain quite free-milling ore, and carry chloride and native and horn silver. There is a large body of quartz in this chimney, and it carries very good ore.

In the drift at the Wild Goose line a winze has been started in the vein, and is down 38 ft. below the tunnel level and shows good ore. Eighty-six feet south of the line another winze has been started, and is down 44 ft. and is in good ore, showing that the chimney continues down 120 ft. South of the 44-foot winze a winze has been sunk 72 ft. in the vein, and a drift run north 125 ft. to connect with the 44-foot winze. Both winze and drift show a strong, well-defined vein, with bunches of excellent ore, and no doubt an extensive ore body exists in the mine at this point.

A drift was started south in the lead from where the tunnel entered the vein, and a chimney of ore found and worked out to near the surface, some of it paying as high as \$100 to the ton. This drift has been extended the past summer, and a very rich and valuable chimney of ore discovered about 60 ft. in length, and 6 to 14 ft. in width. There is a break in the vein for about 20 ft. after passing this chimney, and the drift is now showing good ore in the face.

The ores in this part of the mine are free-milling, carrying chloride, native, horn, bromide, brittle and ruby silver, and can be worked to a higher percentage than the Comstock ores.

The advantages for prospecting the Bullion and Wild Goose mines are seldom equaled. Lying parallel with a deep canyon, a tunnel of 500 to 600 ft. would tap the ledge 400 to 500 ft. below the present workings. And if some party had control of the mines that wished to make money by legitimate mining, with a little capital, proper management and energy, success would be sure. No doubt to-day Paradise presents better opportunities than many of the distant and inaccessible camps in Arizona and New Mexico.

A CHILL for chilling metal has been invented by William Tuttle, Domagiac, Mich. The chill plates being heated by the molten metal, burn the wooden core and allow the chill plates to be withdrawn.

IMPROVEMENTS IN THE FAURE ACCUMULATOR.

This device was a very crude affair when first introduced. During the past year its practical electrical capacity has been fully doubled by the various improvements which have been added to it. The Faure accumulator, as originally made, had three defects: first, that, great as was the advance it constituted on the Plante cell, still its capacity for storing electric power was not so very large; secondly, the rate at which this power could be taken out of it was limited; and lastly, some kind of flannel or felt was employed to keep the red-lead in contact with the lead plates and prevent the plates touching one another. In all these three directions the cell has been immensely improved during the last twelve months.

THE ENGINEER.

The State Engineer's Report.

The Irrigation Problem.

State Engineer William Hammond Hall submitted a report to the State Legislature concerning the work of his department during the past two years. He recapitulates the work accomplished up to January 10, 1881, a full account of which had been previously rendered in two progress reports, and complains that the appropriation of the Legislature of 1881 for his department was insufficient to carry out the wishes of the Legislature as expressed in the Act of appropriation. He had estimated the cost of completing the report on the irrigation problem of the State, and the State map then in course of preparation, and the salary list, at \$50,000, but the Legislature cut down the appropriation to \$20,000, and the entire State map was ordered completed. It will cost \$4,000, he says, to complete the irrigation report, without illustrations; with illustrations, \$1,500 additional. Other estimates are as follows: For maps compiled from the general land surveys, the last set of geographical sheets of which will be published under the auspices of the Federal War Department, \$2,500; for the completion of the general State map and atlas sheet maps of the State, \$12,000. This makes a total estimate of \$20,000, which amount he asks the Legislature to appropriate for the purposes stated.

The Engineer's Work of the Past Two Years.

The report says: During the past two years but little field work has been attempted in the line of the irrigation investigation, and that only by way of closing up unfinished work in certain localities. A more considerable item has been the collection of data for the general State maps. Within this time the State Engineer has been called upon for other duties than those relating to the main work in hand.

In the spring of 1881, at the request of the Governor and the Board of Trustees of the Yosemite valley, he made a trip to the valley, and laid out and advised concerning certain State works there to be undertaken. In the summer of 1881, under instructions from the Governor, he took charge of an investigation of the method and work of construction of the San Francisco seawall, assisted by two civil engineers, Mr. Calvin Brown, of the Mare Island Navy Yard, and Prof. Frank Soule, Jr., of the State University. This work, performed at intervals between July, 1881, and February, 1882, occupied about two months of time. The State Engineer has also been called upon, under the provisions of the law, to regulate the bridging of navigable streams in the State, to perform the duties therein specified in connection with three bridges, that over the Sacramento river at Colusa, that over the Sacramento river at Chico Landing, and that over Big river, Mendocino county, near its mouth.

The State Boundary Line.

The report calls attention to the fact of the inaccuracy of the work for fixing the State boundary lines. It appears that eastward from Lake Tahoe there is a strip of country three-quarters of a mile wide and of a length unknown, but extending many miles, which has been thrown into Nevada. The work of the Government Geographical Survey also shows that this error exists.

Another similar error is also found on the southern boundary line, between this State and Mexico. The southern boundary of the State, supposed to be a straight line or arc of a great circle, between two fixed points in latitude and longitude, according to compilations and examinations made under my direction, is not thus straight, but has in it a "jog," or offset, of about one mile at a point about midway on its course.

State Action in Irrigation.

The importance of State action on irrigation is alluded to. This work implies not only the practical improvement of the rivers themselves, as flood carrying channels, but also the regulation (not construction or maintenance) of private or district works of reclamation and land or corporate drainage, so far as these affect these streams as flood-carrying channels, and also the management of the streams and their outlets and relief escape ways, when in high flood, for their development, protection and the general good of the whole system of works and lands adjacent.

There is also, says the report, an equally wide distinction to be made between the work of keeping waters off from private lands by the building of levees—work which individuals and associations of land owners should undertake, and the improvement of public channels to carry away public flood waters—work which the State must undertake if it is ever to be accomplished. There is also a wide distinction to be made between public waters—those flowing in public streams—which should be guarded by the State, and controlled in their apportionment to claimants thereof, and waters which rise on private property, and which are generally regarded as part of that property, and subject to the control of its owner.

Again, if the public waters are to pass into the hands of corporations, or associated or individual appropriators, for use in irrigation, the transfer of right should be upon such terms as will protect the future irrigators of the State,

and the interests of the people generally who have no water rights. The present laws have no such safeguards. The report calls attention to the necessity of the establishment of a system of control and direction, which will relieve the courts of many vexatious suits, and which will inspire confidence in and add stability to irrigation property, need not constitute an attack on existing claims of right, and need not bear heavily upon or embarrass the users of public waters. The effect, under a wise system, would be felt gradually; all parties concerned would as gradually become used to it, and recognize in State control the only means of protecting the interests of each, as it has proven in every old irrigation country in the world.

A bill has already been introduced looking to legislation in this direction, which is much needed.

USEFUL INFORMATION.

False Glycerine.

Our foreign exchanges have been describing an article sold under the name of glycerine, but containing none of the real article. E. Geissler writes to the *Pharm. Centralhalle* as follows concerning it:

"Some time since an advertisement appeared in a paper in Prague, Bohemia, offering cheap glycerine for technical purposes. A firm in Dresden sent for a sample, which was duly received, but it was expressly stated that this glycerine could not be employed in food, etc. The sample was only tested physically, and as it seemed to be satisfactory, two barrels of it were ordered. After the buyer had received his glycerine one of these notices of falsified glycerine met his eye, and he resolved to test it more carefully, when he soon discovered that he had been deceived, and therefore sent the writer (Geissler) a sample for analysis.

"The pseudo glycerine was of a pale yellow color, nearly clear, and when rubbed on the hand was at first quite oily; then a peculiar dryness of the skin was noticed. The taste was very bitter and unpleasant, comparable to a very impure glycerine—specific gravity, 1.269. When evaporated on a water bath is left 53.2% of residue which looked brown, and at 221° Fahr. was quite dry and friable. When heated more highly, it puffed up and left a slightly alkaline ash. A closer examination showed that the so-called glycerine consisted of chloride of magnesium, starch-sugar (glucose), and dextrine dissolved in water. The analysis showed: Chloride of magnesium, 11.87%; sugar, 17.03%; dextrine, 35.00%. Not a trace of glycerine could be detected in it.

"The ease with which such a swindle can be detected makes it difficult to see how any manufacturer can venture to put it forth, and also goes to prove that the bolder the rogue the better his chance of success."

THE VALUE OF FOREIGN SILVER COINS.—The

Director of the Mint has authorized the publication of a statement of the valuations, in United States money, of the various coins of the world. These valuations are made by the Treasury Department on the 1st of January in each year, and govern Custom House officers in the appraisement of dutiable goods for the purpose of fixing the duties. The list of valuations is substantially the same as a year ago. The only changes are annexed:

	1882.	1883.
Austria, Florin.....	40.6	40.1
Bolivia, Boliviano.....	82.3	81.2
Ecuador, Peso.....	82.3	81.2
India, Rupee.....	39.0	38.6
Mexico, Dollar.....	89.4	88.2
Peru, Sol.....	82.3	81.2
Russia, Rouble.....	65.8	65.0
Tripoli, Mahbub.....	74.3	73.3
United States of Columbia, Peso.....	82.3	81.2

The above are all silver coins, while the valuations are in gold coin of the United States. The peso of the Argentine Republic, not valued a year ago, is now valued at 96.5, whether in gold or silver.

GREASE FROM THE CHINESE TALLOW TREE.—

The increasing rarity of tallow of animal origin has attracted the attention of candle and soap manufacturers to a vegetable grease introduced into Europe toward 1848, and the use of which is steadily growing in France and England. The tallow tree is of Chinese origin; it grows also in the northwest of India, and has been introduced into South Carolina, where it has been cultivated for ten years. It produces a fruit the core of which is covered with a layer of thick tallow, and contains a yellowish aromatic oil, used in the same country as a heating agent. After the plucking, which takes place in July in the south, and in October in the north, of China, hot water is poured on them, and the grease is skimmed off, after getting cold, with spoons; the tallow, molded into the form of bamboo canes, is directly brought into commerce. This tallow presents the appearance of a greenish mass, crystallized, having a peculiar odor. It melts at 44.3°, and becomes solid again at 40.3°.

SPIDER SILK.—There was, not long since, exhibited by Mr. Rolt, an English merchant, a thread 20,000 ft. long, spun by 22 silk spiders in less than two hours, and which was five times as fine as the thread of the silk worm,

DYEING LEATHER.—In the glove trade the leather has hitherto always been dyed by brushing on the dyes by hand. The defects of this method are its slowness, the occurrence of large, soiled edges on the fleshy side, and, notwithstanding every care being taken, the uneven character of the dye produced. To avoid these, Joseph Kristen, of Bruhl, has a process in which even dyeing is obtained by the application of centrifugal force. The skin to be dyed is fixed on the center of a horizontally rotating disk. The color is also fed on to the center, and by the rapid revolution of the disk, is spread equally over the whole surface. The color is forced on to the disk by means of a pump, or it merely flows from a reservoir standing at a higher level. The excess of color driven off at the edges of the revolving disk is collected and used over again until the skin is fully dyed. To dye skin by this method takes from 10 to 15 minutes. A single color pump may serve for at least five machines, which would require only one attendant, so that by the above arrangement one man could in 12 hours easily dye 150 skins, possessing great evenness of dye and free from spotting.

A NEW CARTRIDGE.—An entirely new departure in cartridges for guns was shown at the Seventh Regiment armory recently. The inventor claims that his cartridge will not heat the gun, that it is self-ejecting, has twice the propelling force of powder and is much cheaper. It will also, he says, cost very much less than metallic cartridges of gunpowder, and it will not be injured by water. In appearance the cartridge looks like a Chinese fire-cracker with the red paper taken off. Its materials and mode of preparation are secrets, but it looks like paper pulp soaked in some explosive material, and pressed into a hard roll. The ball is attached to the end of the roll, and the whole thing leaves the gun together, on the "sky-rocket principle." It can, he says, be adapted to any gun, and will revolutionize the ordnance departments of the world. The inventor fired one of the ball cartridges into a spruce log 8 inches thick. The ball passed entirely through the log and a 2-inch plank behind it, and flattened against a stone wall. After firing 12 rounds out of the same gun there was no apparent heat and no fouling. A more scientific and satisfactory test will be made at the State Arsenal, probably in a few days, before Government and State experts.

ENGLISH SHODDY COTTONS.—England exports annually an enormous quantity of cotton cloth, and the whole amount of the average price it is said is only 6 cents a yard. The exports to Australia average highest, 13 cents. The United States comes next, buying at an average of 11 cents. Germany and France take their portion at 8 cents, South America buys at 6½, Turkey at 6, British India at 5½, China at 4½, and the west coast of Africa takes large quantities at 2½ cents. These stuffs are the goods which the savages receive in barter. They are a flimsy fabric of loose threads strung together like mosquito netting, and the interstices filled in with a heavy sizing of clay, starch, etc., and is never intended to wash, as the first application of water nearly dissolves the fabric.

A CHEAP VARNISH.—A brilliant black it is said can be produced on iron and steel by applying with a fine hair brush a mixture of turpentine and sulphur boiled together. When the turpentine evaporates there remains on the metal a thin layer of sulphur which unites closely with the iron when heated for a time over a spirit or gas flame. This varnish protects the metal perfectly, and is quite durable.

TO HARDEN STEEL.—Take two teaspoonfuls of water, one-half teaspoonful of flour and one of salt. Heat the steel enough to coat it with the paste by immersing it in the composition, after which heat it to a cherry red and plunge it into soft water. If properly done, the steel will come out with a beautiful white surface.

GOOD HEALTH.

Treatment of Constipation in Infants.

[Written by L. U. McCANN.]

A lady correspondent asks the advice of some of "the mothers" in regard to the best treatment for her babe of ten months who suffers from obstinate constipation. The results of our experience upon this subject are heartily at her service, for we regard this as a very serious trouble to a child of that age. It is generally at this time, in the midst of its teething, which process of itself induces a feverish state in the system, and an inclination of the blood to rush to the head, when, if complicated with inactivity of the bowels, the result is often a severe congestion of the brain, or a sudden and fatal spasm, which, without warning or time even to call in the doctor's aid, snatches the little one from the mother's arms and stills forever its baby prattle in the cold embrace of death. Hence we say that a child at this age, and in-

deed, throughout the whole process of its teething, requires that the utmost care be used to keep the bowels in a state of healthy activity, as its safety at this critical time depends in a great measure upon having no obstructions of this kind to contend with.

Much may be done to prevent this trouble, if the baby is nursing, by a proper regulation of the diet and habits of the mother herself, as the state of her own bodily health will undoubtedly influence that of her child, through the quality of her milk. We have known many mothers who regulated their babies entirely upon this plan, and when necessary, by using a more laxative diet, or even by taking a mild purgative themselves, would so thoroughly affect their babies that the little ones received all their medication in this "second-hand" manner, not even required whilst nursing any other treatment for their troubles.

It is a bad plan to get into the habit of dosing children for every ache or pain, and upon all occasions. Babies are so little, and their needs in this regard are so infinitesimal, that more harm than good is apt to be done in unskillful hands, by giving them, at any time, strong medicines. When there is a real need for it, however, there should be no delay in calling in the best medical aid that can be procured, for a little child's hold upon life is a very slight one, after all, as is proved continually by the statistics of the fearful mortality among them.

Yet, with regard to the little every day ailments to which babies are heir to, we have long proceeded upon the principle that "an ounce of prevention is worth a pound of cure," and especially is this true in this matter of constipation. We believe, in all ordinary cases, the bowels can become regulated without the aid of any medicine, by having a regular time every morning, wherein the child is urged to relieve itself, when it will soon come to do so of its own accord, at that hour, as a matter of settled habit. When, from any cause, nature seemed to need a little assistance, we have found that a teaspoonful of molasses, stirred into a glass of cold water, from which the baby was given a copious drink the last thing at night and the first thing in the morning, was, if persevered in, all that was necessary as a mild aperient for the little one, soon bringing it into regular habits again, whilst the sweetened water was considered a beverage just suited to a baby's taste.

In more serious cases the quickest and surest relief (and one perfectly safe from any after ill consequences), is obtained by giving the child a simple enema, composed of water, made a little soapy, to which a teaspoon of sweet oil may be added if thought best, using about a teaspoonful of the mixture at a single time; for it is a great but common mistake to overdo this thing altogether by pumping in too large a quantity as an injection. It is much better, especially for a child, to administer only a small enema at once, leaving this to be retained as long as possible, when it will have the effect not only of softening the secretions, but of allaying the feverishness attendant upon such a disordered state of the system.

It is better that this dose should be repeated in a little while if the desired object be not attained than to administer the double dose at one time, as the retention of the solution in the system for a while seems to effect a more permanent good in this disorder.

In obstinate cases, or where, as is sometimes the fact, there seems to be a natural predisposition to costiveness at all times, it is recommended that a single syringe full of water be injected after each evacuation, and retained in the system until nature demands its expulsion.

This practice is said not only to be a sure cure of constipation in either children or adults, but also one of immense benefit to that distressing complaint known as hemorrhoids or piles, from which so many people suffer year in and year out without any relief.

The retention of this cold water allays the irritation of the parts and prevents the tumefaction of the blood vessels in this region, whose derangement from a healthy state in the first instance has generally been caused by the straining consequent to long-continued constipation. But let us return to our baby. If this child of 10 months is fed at all (and about this time these little ones like a change of diet now and then as well as the rest of us), feed it upon corn meal mush and milk or gruel, sweetened with either molasses or brown sugar. White sugar, be it remembered, has so constipating an effect that by some it is even considered as a sovereign panacea for all the summer complaints of children; so, though it is undoubtedly purer, it is best not to be used under the circumstances. Or, the baby may be given a baked apple, pared and cored, of course, and mashed soft so as to inconvenience the little one whose "grinders are few," if any, at this time, which will act as a gentle laxative and assist to overcome its trouble. Meanwhile let the mother do all in her power through the regulation of her own diet to give her milk the desired laxative quality to promote her baby's welfare. Using no stimulants of any kind, nor highly spiced or seasoned food, for herself, and taking even her tea and coffee, if she must have them, "to make milk for the baby," more than half hot water until the health of her child in this most important point is firmly established upon the basis of a regular daily habit, and in the sweet content and good nature resulting from its perfect health she will have a thousand times repaid for any sacrifices she has had to make at the table to secure so desirable an end.

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SAN FRANCISCO:
Saturday Morning, Feb. 3, 1883.

TABLE OF CONTENTS.

EDITORIALS.—Mine Timbering; Operating Pumps in Mines; Alaska as a Mining Region, 73. Passing Events; Impurities in Copper; The Mescalita Drift Mine; Notes from Eureka, Nevada; Montana Mining District, 80. Patents and Inventions; Notices of Recent Patents, 84.

ILLUSTRATIONS.—Slope Timbers; Drift Timbers, 73. Scale Insects on Norfolk Island Pine and Oak, 78. The Montana and Carpenter Mining Districts, Meagher County, Montana, 81.

CORRESPONDENCE.—Colorado Notes, 74.
MECHANICAL PROGRESS.—Steam Heating; To Melt Babbit Metal; Residue Obtained in Practice; Oiling Machinery; The Power Required to Bear Hot Steel Blooms; Fire-Resisting Wooden Flooring; Pending Tubes; Finishing Saws; Increasing the Strength of Iron, 75.

SCIENTIFIC PROGRESS.—Important Modifications in Electric Lighting; Rapid Purification of Sewage; Apoptosis; New Green Color; Sewage Gas on Metals; Something New in Ballooning; Impurities in Copper; Pictographic Color Printing, 75.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Assessments, Meetings and Dividends, 76.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon and Utah, 76-7.

THE ENGINEER.—The State Engineer's Report, 79.
USEFUL INFORMATION.—False Glycerine; The Value of Foreign Silver Coins; Grease from the Chinese Tallow Tree; Spider Silk; Dyeing Leather; A New Cartridge; English Shoddy Cottons; A Cheap Varnish; To Harden Steel, 79.

GOOD HEALTH.—Treatment of Constipation in Infants, 79.

NEWS IN BRIEF.—On page 76 and other pages.
MISCELLANEOUS.—The Floridas; The Shakespeare Smelter; Making White Lead; About Wood, 74. Steel-Iron; The Bonanza King Mine; Scale on Ornamental Trees; The Paradise Mines, 78.

Business Announcements.

Engines and Pumps—Tatum & Bowen, S. F.
Lubricating Oils—Tatum & Bowen, S. F.
Mining Engineers—Wagoner & Hammond, S. F.

Passing Events.

The little spurt in the stock market this week, and the notice it attracted, would seem to indicate that people were expecting something from the Comstock after all, and that many will not take the experience of the past, but will try their fortune again.

The anti-debris bill, giving the plaintiffs power to join miners as defendants in an action to suppress a nuisance, was killed by refusal to allow it to pass to third reading. The courts decided that the plaintiff must prove what particular mine the debris came from. By this bill they would not have to do so.

There is nothing specially new from the mining regions aside from what we note in our "Mining Summary" for the week.

The *Calistogian* says: The latest excitement in mining matters here was that occasioned by the finding of fine quartz croppings in the mountains four miles south of Windwhistle, in Sonoma county. The ledge can be traced some distance, and the quartz taken from it is really fine, and assays show it to contain from \$14 to \$692 silver to the ton, the former being the very lowest. Of course this ground has already been well covered with locations. Nothing of any importance had previously been discovered in the hills and mountains on that side of the valley; but the croppings mentioned are, as near as we can judge, the finest yet found in this locality.

Impurities in Copper.

From the circumstances that the refiner tests the quality of copper by forging a hot sample, it will be inferred that the effect of impurities upon its malleability and tenacity is more perceptible at a high than a low temperature. The foreign matters which commercial copper is liable to contain are arsenic, sulphur, antimony, tin, bismuth, lead, silver, iron and nickel. Of these sulphur and antimony are generally considered the most injurious in diminishing the malleability and tenacity of the metal. Arsenic is very commonly found in copper, amounting, in some of the Spanish copper, to as much as one part in a thousand, and was formerly supposed to be as injurious to the quality of the copper as antimony is, but modern experience has shown that copper may be easily rolled and drawn into wire even when it contains a considerable proportion of arsenic. A small proportion of tin is believed to increase the toughness of copper, but bismuth and nickel have the opposite effect.

The conducting power of copper for electricity is reduced in a most striking manner by the presence of foreign matter, so that in the construction of telegraphic apparatus it is important that the purest attainable copper wire should be employed.

Pure copper is scarcely inferior to silver in its conducting power, and the conducting power of the native copper from Lake Superior, which is almost pure, stands to that of pure copper in the proportion of 93 to 100, whilst the Australian (Burra Burra) copper, also very pure, has a conducting power of 89, and the Spanish copper, which contains much arsenic, has a conducting power only one-seventh of that of pure copper, or in the proportion of 14 to 100. The addition of a small proportion of phosphorus (about five parts in a thousand) to copper is found to harden it and somewhat to increase its tenacity; it is also said to render it less liable to corrosion when exposed to the action of seawater. By adding arsenic to copper, in about the proportion of one to ten, a white, somewhat malleable metal is obtained, which is not easily tarnished by air, and is much harder than copper. This compound, which is employed for clock dials and for thermometer and barometer scales, is made by heating five parts of copper clippings with two parts of white arsenic (arsenious acid), arranged in alternate layers and covered with common salt, in a covered earthen crucible.

The Mining Bureau.

At the session of the Legislature two years ago a concurrent resolution was passed to remove the specimens of ores at Sacramento to the State Mining Bureau in this city. It was found, however, that a new law would have to be framed. The matter, therefore, came up this session. The Mining Committee reported favorably, but the bill was rejected by a vote of 14 to 9.

It seems too bad that the collection should not be added to the already large one at the Bureau in this city; and the refusal looks like a "pointer" to indicate that the support the Bureau asks for will not be granted. The tax on sales of mining stock is now so low that the Bureau is running very short of funds. If it is to be maintained at all it should be properly supported. Mining has done a great deal for the State, but the State has done very little for mining. It ought at least maintain the Mining Bureau, which furnishes information for the mining community.

The trifle asked for should be voted. It looks strangely to see in a mining State like California a niggardly spirit prevail where this industry is concerned.

A NEW MINING CAMP.—Backbone Creek is looking up as a mining camp. Last Saturday 15 of the miners met and formed the Backbone mining district, appointing a committee to frame by-laws for their government, to report the first Saturday in May, until which time they will be governed by the United States mining laws. The mouth of Backbone creek is about 16 miles from Shasta, and the summit of the ridge about 20 miles. A road has been surveyed from the creek to the summit, with a grade of about 500 ft. to the mile, and this, with the railroad passing through it, will combine to make the camp one of prominence, especially as the district abounds in rich mineral deposits. —*Shasta Courier*.

Notes from Eureka, Nevada.

[From our Own Correspondent.]

EDITORS PRESS.—The past week has developed nothing new in the mines of this district. The Albion Company having paid up, all the excitement caused by unfounded rumors has subsided. The mine is looking well. The working force, however, has been decreased, but this is a point in favor of the stockholders, and as such is appreciated here. The delay in restarting the furnaces has been caused by the water pipes from the reservoirs having frozen. This will be remedied immediately. From the Richmond mine reports are still encouraging.

At the Eureka Con. old works there is nothing to note. At the new (Locan) shaft work has been resumed and the contractors are sinking at the rate of 15 ft. per week. The shaft is now down about 950 ft., and will be carried 250 ft. deeper, when a drift will be started towards the ledge line, which will be cut at a distance of about 200 ft. from the shaft, and, I think, 150 ft. below the 14th level in the old workings, now under water.

On Adams' Hill North

There are good signs of progress. A hoisting engine has been placed on the Williamsburg shaft, and work was resumed in the mine to-day. At the Boston and Eureka are also marks of improvement. On Adams Hill proper the lessees of the Horace Tony mine have been quite fortunate, having hit upon a perfect little bonanza, from which they have extracted several tons of fine quartz and carbonate ore. At the Eureka tunnel work is progressing as usual, and 60 tons of ore has been shipped to the furnaces during the past week. Yesterday I took a trip to Silverado mountain, where I found many prospectors actively at work. A shipment of ore from the Western Globe mine has just been made to the Richmond smelters, six tons of which yielded over \$300 per ton and the balance of four tons at the rate of \$150. It is thought that the Rescue mine will be started up soon, for which occasion a 22-horse power engine will be provided. This is a very valuable property, which, like others in its vicinity, has been closed down on account of mismanagement and the reckless expenditure of the company's money.

The Queen mine is at present yielding ore that is exceedingly rich, assaying from \$500 to \$1,500 per ton. The Silver Nugget mine is doing splendidly under a sub-lease. A tunnel run into the hill from the east side shows ore of high and low grade. A winze has been sunk on a vein to a depth of 100 feet, and from a drift run on it a large amount of ore has been extracted. Several shipments have been made from it, and another will be ready in a few days. Its neighbor, the Diagonal tunnel, enters the mountain from the east side 1,100 feet above the valley level. It runs about north 30° west for a distance of 700 feet, where the course changes to almost west, finally ending 1,000 feet from its face in a southerly direction. At a point 875 feet from the mouth is a vertical winze, from which a drift has been run almost even with the line of the tunnel. At the end of the latter is an open seam giving evidence of a near approach to ore. This portion of the mine will be cut up into sections, and not a spot as big as a half dollar will be left unprospected, for here rich developments are confidently anticipated. From the surface 350 ft. down to the tunnel level an incline shaft has been sunk, following ore almost the entire distance. A break occurred about 20 ft. above the tunnel level, leaving nothing but a closed seam to follow, but which it is thought is sufficient, as it still carries fine indications with it that in the early days of the camp were not understood. The Maryland mine in its vicinity was formerly owned by Mr. John A. Paxton and others, who, after getting several handsome dividends from it, sold to a company who, in place of using their capital to develop the mine, built a costly mill which took all the money in their treasury to pay for and then went into liquidation. Richard Berryman & Co. have had a lease of the Diagonal mine for the past three years, but until last May had not done any work on it. Since then five men have taken out ore, the net profit on which has reached the sum of \$5,046, and there are large masses of low grade ore still remaining in the chambers. One of the great advantages of prospecting on Silverado mountain is the facility with which the work can be done. As an instance, these men ran 817 feet of drifts and raises in six weeks, being equal to more than four feet per shift made by each man. Not a single pound of powder was used in the work. At the highest rate of wages paid to miners in this section of country this work has been done at a cost not exceeding one dollar per foot.

Attracted by the inducements offered, Mr. Berryman and a party of friends have secured 120 acres of the adjoining land in six locations, each being 1,500 feet long by 600 feet wide, which they will shortly proceed to develop by means of a tunnel to be run from a point near the base towards the highest peak of the mountain.

M. H. JOSEPH.

Eureka, Nev., January 29, 1883.

The inquest at Milwaukee on the Newhall house disaster has led to severe criticism of the Fire Department.

Montana Mining District.

Description of a Promising Region.

[Written for the PRESS by THOMAS F. CORTELL.]

The Montana mining district, Meagher Co., Montana Territory, lies in about 46° 50' north latitude, 110° 45' west longitude, and is situated on Main Belt river, about eight miles from its source. In the Little Belt mountains, a spur of the Rocky mountains, running in an easterly direction from the Missouri river, near "The Gate of the Mountains," accessible by good wagon road to White Sulphur Springs, the present county seat, a distance of 32 miles. To Helena, the Territorial capital, a distance of 87 miles; to Benton, head of navigation, 75 miles by road now in the course of construction, which can then be made available for machinery and supplies. The same road gives access to the Clendenin M. & S. Co.'s works, at Gold Run, Barker mining district, a distance of 20 miles. This district was discovered in July, 1881, by Messrs. Neilhart, Harley and O'Brien, the discovery being due to the impetus given to prospecting by the discovery of "Yo-Go," Barker and the Carpenter mining districts, the existence of silver ores having, however, been known since 1871, but the hostile attitude of the Indians prevented any investigation of this subject until 1879.

The Mines of this District

Are found in the mountain foothills in the immediate vicinity of Belt river, at an altitude of 4,000 to 5,000 ft. above sea level, being well watered by Belt river, a stream carrying at its lowest stage 1,000 inches miner's measure, intersecting the camp midway, having an average fall of 40 ft. to the 1,000 with numerous streams and runlets.

In the immediate vicinity of the camp there is no live timber, the country having been burnt off seven years ago, but this is amply compensated for by the vast forests which exist about five miles above camp up Belt river and O'Brien creek. The supplies from the latter are already accessible by the new wagon road to the county seat. Good mining timbers and good merchantable lumber can now be delivered at \$25 and \$30 per M in camp. Belt river itself furnishes ready access to the timber near its source, owing to the favorable nature of the stream for "driving" during the months of June, July and August. Cord wood can be delivered at \$3.50 in camp.

An inexhaustible supply of first-class hay can be delivered from Belt Park, three miles distant, at \$15 per ton.

The Supply of Coal

Is practically unlimited at a distance of 22 miles from camp. The coal pertains to the Dakota group, No. 1 (M. & H.), early cretaceous period, and underlies the whole country on the north and eastern foothills of the Little Belt mountains. The coal consists of three or more veins easily worked from the surface by means of adits and possesses valuable coking qualities, quite a desideratum for a smelting camp. (Coke as a fuel affording a regulus richer in silver but poorer in lead than when charcoal is employed, with shorter duration of the smelting period). The coal can now be obtained at \$5 per ton at the mines. This coal belt is now determined for a distance of 35 miles along the northern base of the mountains and is being extensively developed at Pittsburgh by Mr. John Castner, and near the mouth of the Big Littlestone creek by Mr. Ellis, and also at Sand Coulee by Messrs. McKean and Culbertson. Returning to the Montana district we find that

The Mineral Lodes

Consist, as far as yet prospected, of about 26 parallel veins, with a strike of about 10° east of north, intersecting the soft zones of granite, of which the country rock principally consists. The granite, which is principally porphyritic and hornblende, has a uniform dip to the south of from 30 to 40°, being cut at right angles by the veins above mentioned on the summit of "Black Baldy," and also in the southwestern part of the district, as shown in the map accompanying this article. This granite is capped by quartzose rock (an alluvial matrix of sandstone and quartz pebbles, evidently formed by heat and pressure). On the east bank of Fly creek is found (granite) diorite. When crossing this creek westerly this gives place to gneiss. South of the Frisco lode a belt of talcose slate disrupts the lodes. This belt commences at the river, and has there a breadth of 200 ft., extending southwesterly in a triangular shape until it reaches the quartzose reef, its base there having a width of 1,500 ft. South of the Reagan lode a body of porphyry is found about 1,200 ft. wide, the length being limited, the granite reappearing on O'Brien creek. East of "Black Baldy" the granite gives place to a slate rock containing no mineral veins.

The lodes of this district, without exception, are accompanied by porphyritic dykes which generally form the hanging walls of the lodes. In the neighborhood of the Queen of the Hills seems to be the central line of division between the two distinct grades of ore found in the district. Those to the east, including the Queen of the Hills, dipping west, contain silver glance, chlorides, sulphides and antimonial silvers (ruby and brittle silver), and the ores spangled with wire and native silver in foliated form, and in some instances wire silver twisted and entangling the ores from wall to wall with rich argentiferous galena, but principally antimonial ores rich in silver, with copper ores, such as erubescite, chalcopryite and carbonate; these last named ores are coming in at deep mining, and antimonial and copper ores will predominate

on development. These ores contain no gold, with the exception of the Hillsdale, which by fire assay gives a trace, and the Green and Weatherwax lodes, on Snow Creek, are said to contain \$40 to the ton, but I failed to find a trace, although gold is known to exist on Carpenter creek in the alluvial wash.

On the west of the Queen of the Hills the veins dipping east contain baser mineral; associated with some of those before mentioned are manganese, galena (light in silver), arsenical iron, zinc and antimonial blende, each of lead, etc.; but in the Huxley, Teton and Mountain Chief (on the one vein) the richer minerals, as associated with those of the eastern part of the district, with wire silver in discrete coils distributed in the small chambers in the matrix of the ores invariably associated with brittle silver and silver glance. Throughout the entire district manganese colors permeate the matrix of the ores as well as the granite and igneous dykes contiguous similar to the Summit Valley district (Butte). By glancing at the map an observer will be struck with the

Parallelism of the Veins.
The numerous favorable opportunities for run-

on the east, the hanging wall being porphyry, as before mentioned. The walls, as a rule, are soft, hard ones being the exception, with crystalline granular talcose gangue, often of a fine, impalpable texture. Proceeding to

A Description of the Mines.
What may be said of one may be said of many, and those at the present time being developed will, I think, be sufficient.

Commencing at the east end of the district, we find first, Banner and Bald Eagle, Fitzpatrick & Co.; elevation, 700 ft. above creek. This lode cuts the quartzose cap of this section. Width of vein 4 ft.; working test of ore from full width of vein, 47 ozs. silver; samples tested by Prof. Foss, C. M. and S. Co., 49 ozs. developed by shaft. Southern View and Kuntuck, Lake & McKaskal; elevation, 1,500 ft. at creek; character of ore, antimonial and carboniferous; sample assays 61 ozs. Seven hundred and fifty feet west we arrive at a line of fine locations on a vein showing some of the richest and most promising prospects of this district, at an elevation of 1,300 ft. above Belt river, and commencing at the Minnehaha and Montana. Bell, by Chamberlin, Macintosh & Co.; width

ery south the main vein is uncovered and shows a width of 8 ft. for some 200 ft., and south to the discovery of the Queen of Montana, by Rafferty & Co., where this vein is 10 ft. wide, and pay well distributed throughout the vein.

Deadwood and Frisco, by Neihart & Co. This vein has been determined for a distance of 3,500 ft. north from the Frisco, averages well, and is a bold vein carrying considerable copper.

Corra, by Mortenson & Co., "Os. Coxgis," by Coryell & Co., Massachusetts, by Hanna & Merion, and the Oregon, by Caruthers & Co., all on the same vein; bold vein, four feet wide and pay streak 22 inches; assays of sample \$71 throughout the vein at the Massachusetts shaft.

Queen of the Hills, Home Stake and O'Brien lodes, by Neihart, Harley & O'Brien. There are six locations on this vein, and ore exposed between walls of the same character. The extreme southerly locations are carbonate ores, while those of the Queen of the Hills as before described, while the matrix in the O'Brien lode is exclusively sulphate of baryta in massive form. These three locations present throughout their entire length the most extensive outcrop of ores that has been discov-

bodies of ore with little development, assay 22 ounces. Teton and Huxley, by O. C. Mortenson & Co. and Neihart & Co., are developed by two shafts; width of vein four and one-half feet; a pay streak 18 inches, and widening with development; samples \$245, \$273, \$860, \$920, \$940, \$160 and \$420. Ores from this mine treated by the C. M. & S. Co. net 284 ounces. The developments on these mines have shown as uniformly rich ore as any in the district.

The Samson, by P. Fehrenbach & Co.; width of vein, 10 ft. This location is remarkable for its strength, principally galena, antimony, zinc and manganese. Samples of this vein entire are 42 ozs. This mine is being developed by shaft and drift, the latter developing it to a depth of 500 ft. (on the vein), which everywhere shows remarkable strength.

The Hillside and Amelia, by D. B. Mackintosh & Co. Three or more parallel veins are contained in this surface ground. The Samson, running through the Hillside and Sunny South ground; width of vein, 10 ft.; character of ore same as Samson throughout. The main vein on the Amelia, as far as developed, discloses a width of 8 to 10 ft. crystallized quartz and spar, with



ing drifts on the mines, the remarkable continuity of the lodes and an examination of the leads on the ground show so many or shutes that the strength of the ledges are apparent at a glance. When we take into consideration that the openings on the veins hereinafter mentioned are contained in a space two and one-half miles square, and throughout that space in gulches or hills the veins preserve the same parallelism and continuity from an altitude of 750 to 2,500 ft., showing the depth to which these mines are now, and can be readily developed by drifts, rendering hoisting and pumping machinery almost unnecessary until they acquire 1,000 ft. of development. The dimensions of the claims are 1,500x600, where surface ground will admit and in several of the locations four parallel and distinct veins are included. The character of the gangue or matrix is principally heavy spar, throughout the entire district appearing in tabular form, also fibrous and compact, and resemble the barata artificially formed after the experimental researches of De Senamet and others, demonstrating its formation or production by the action of water at high temperatures and pressures; associated with this spar is quartz and feldspar.

The Width of the Veins
Vary from three to ten feet, increasing in width as developed. The strike, dip and extent of outcrop as mentioned above. The foot-walls are of dioritic character—impregnated with manganese in the lodes west of the Queen of the Hills, and hornblende granite in those

of vein, 5 ft. 5 inches; samples assay \$421.80, \$860, \$114 and \$1,219.80. Next we find the Wide Awake and Fitzpatrick, by Fitzpatrick, Largent Bros. & Co.; width of vein, 5 ft., with very rich pay streak 2 ft. 4 inches; developed by adit; assays by ton \$883, \$1,067, \$1,164, \$1,518 and \$1,250; U. S. Assay Office, Helena, \$3, 078.95. Ores from the Fitzpatrick treated by the C. M. and S. Co. netted 250 ozs. (full width of vein).

Maud S., by Chamberlin & Bell; width of vein, 14 ft.; samples 56 ozs.; one foot samples 350 ozs.; St. Julien, by D. B. Macintosh & Sanborne, same as Maud S.; Dexter and Alexander, same, with manganese appearing in these ores; Atlantis & Boss, Neihart, Barrett & Co.; on this vein there are five locations; character of the ores, gray carbonates, rich in silver, developed by shaft; assays, \$71.10, \$87.30 (for samples); width of vein, 4 ft. 8 inches.

North Star and Roseanna, by Power, Lamb & Co., and Darwin, by Neihart & Co.; width of vein, 3½ ft. No developments as yet.

Yellow Jacket and Helena, Neihart & Co.; width of vein not known in shaft, but is in five feet of ore and no hanging wall; assays 22, 26, 41 ounces; by Foss; sample by McVicar, 136 ounces. South Carolina and Texas, by Neihart & Co., vein eight feet wide in shaft and drift; sample of vein, \$46.75, 112.20 ounces. This location consists of one main vein dipping east, and a vein parallel on the west dipping to the main vein, and two side veins east dipping west to the main vein; 180 ft. from the discov-

ered for years in any district. The samples taken from the several drifts and shafts along the vein range 335, 644, 492, 111, 101½, 85, 52, 97, 275 ounces, and highest for surface ores \$40 ounces. A drift is now being run on the Home-stake on the vein, and will be continued for 300 ft. this winter. They are now in 138 ft., and the ores assay from 60 to 4,800 ounces to the ton. It is intended to push this drift the entire length of the three locations. They have now reached a depth of 71 ft., and will when they reach the O'Brien, with 1,700 ft. of drift, be 700 ft. in depth. They are driving on the vein, which is now 5 ft. 8 inches in the face. Here can be seen the wire, ruby and brittle silver, with the silver glance in beautiful fibrous matrix of baryta. These mines are

Owned by Good Practical Miners.
Who are prosecuting the work in person. Commencing at the north boundary of the O'Brien location we find the Ed. Man and Mountain locations running 15° west of north, by Man & Caruthers. This vein at the bottom of the working shaft shows a width of 10 ft. in the crosscut. The gangue is highly crystallized quartz, containing galena and gray carbonates, together with other high grade minerals; samples of ore the entire width assay 38 ounces; a rich streak next the hanging wall assays 684 ounces. The Little Treasure, by Hamilton & Neihart, a new find, with little development; vein three and one-half feet wide, antimonial ores assaying 81 ounces.

The Great Western and Hercules, large

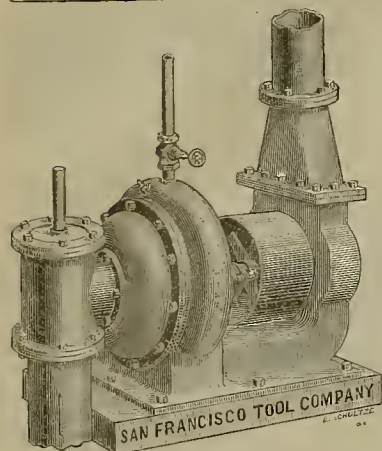
high-grade galena samples of pay streak \$303, and it is likely that this vein traces the Hillside and Sunny South grounds, Montana, by Crandal & Co.; this vein has been determined for a distance of 25,000 ft.; character of mineral, argentiferous galena; width of vein, 4 ft. 8 inches. Samples assay 91 ounces. The Huron, Gothrob, Rosa, Redrock and First Discovery, in the westerly part of the district, will shortly be developed and can then be reviewed; their general character is galena associated with richest minerals.

From the foregoing description it will be seen that accurate survey and

Close Investigation Has Been Made
Of these mines and their surroundings; that the natural facilities for mining, drainage and reduction of ores, and as an ore-producing district, is unexcelled. Advantages exist for transportation of machinery and supplies, by water or rail, the latter more especially, as they have faithfully promised the N. P. R. R. at Townsend, 65 miles distant, in July next, and to that point a good wagon road is already completed from the mines via the county seat.

It is proper to mention that the town of Neihart is already laid out, and promises at no distant day to be a flourishing community.

Space not permitting, I have deferred a description of the Carpenter district until the following month, when I expect to be able to report the Yo-Go, Woodhirst, Shaw, Barker and other mining districts of the northern part of Montana.



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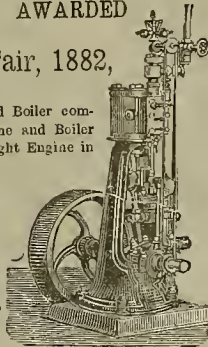
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At Mechanics' Fair, 1882.

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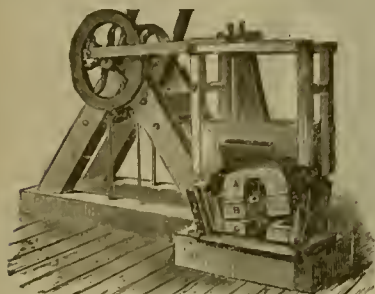
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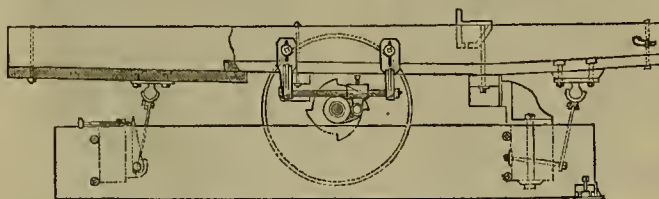
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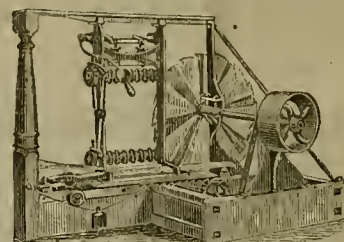


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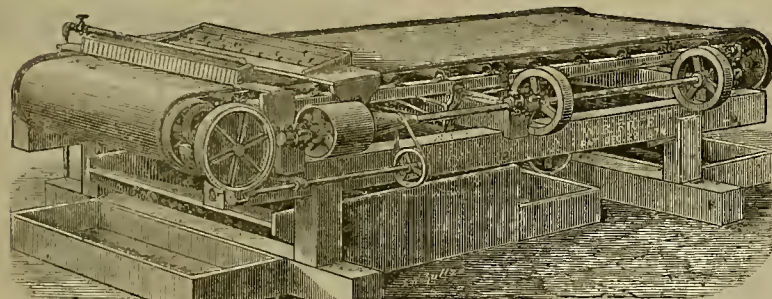
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That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

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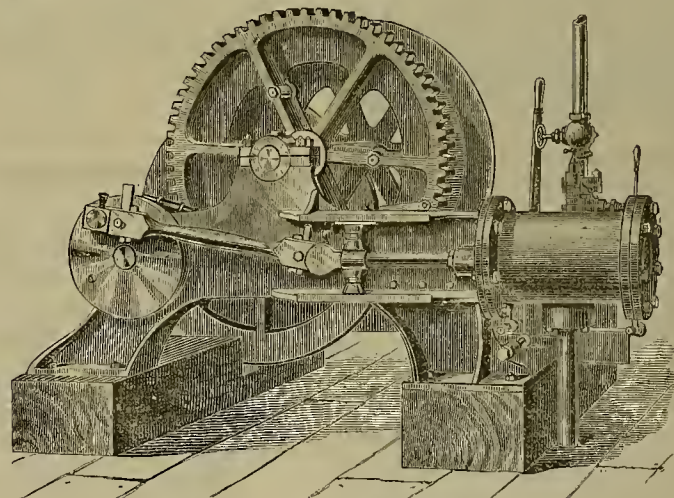
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List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING JAN. 23, 1883.

271,024.—POISON FOR SQUIRRELS, ETC.—A. R. Booth, San Luis Obispo, Cal.
271,047.—VEHICLE BRAKE—George R. Duval, Benicia, Cal.
270,900.—PUMPS—S. Jackson, Stockton, Cal.
271,100.—ICE CHEST AND RESERVOIR—C. D. Morin, Woodland, Cal.
271,102.—RAILWAY CROSSING BARRIER OR GATE—Wm. B. Morris, S. F.
271,123.—HORSE POWER—E. A. Rix, S. F.
271,130.—CHURN—E. J. Rowe, R. Holmes and J. Dawson, Eureka, Cal.
271,148.—STRAW-BURNING BOILER—Joseph Stevens, S. F.
271,159.—DRAG SAW—Charles Thompson, Corvallis, Oregon.
271,098.—FILTER—James Miller, Oakland, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

COMBINED WRENCH AND PINCHERS.—Samuel S. Willmer, Anderson, Shasta county. No. 270,356. Dated January 9, 1883. The stock or body of the tool consists of a hollow casing open upon one side. At one end it has formed with, or has secured to it, the stationary joint of an ordinary wrench. At its other end it has a jaw of the pinchers. The movable jaw of the wrench is adapted to slide upon the shank of the stationary jaw. To use the wrench a pin is pressed to one side which disengages a part from the movable shank, and the movable jaw may be set at any point. A spring receives the jaw at the point set. To use the other end of the tool a swinging jaw is opened away from the other, or stationary jaw, and its limit is defined by the position of a peculiar ring, adapted to slide backward or forward. In this tool the inventor has combined two useful ones, both of which are frequently needed in the same work. In places where the wrench end cannot be used on a bolt, the pinchers end can be employed, as where the tool must be turned on its longitudinal axis. It is easily constructed and may be repaired without trouble when necessary.

REVOLVING SPRINKLER.—John H. Henderson and Emilio Schutz, Sierra Buttes, Sierra county. Dated January 16, 1883. No. 270,664. This improved sprinkler is of that class in which the revolution is obtained by the unequal pressure of escaping water upon the familiar principle embodied in Barker's wheel. The invention consists in providing revolving arms, each with a single nozzle at their outer ends, one of which is directed to discharge its water to fall inside of the circle described by the ends of the revolving arms, and the other to discharge outside of said circle, whereby both the center and outside of the circle to be sprinkled is supplied. With the nozzles are connected dashing devices, whereby the water is spread over the surface in any desired fineness of spray, said dashers being also made by changes in position to retard revolution by effecting reaction. The object of the invention is to provide a revolving sprinkler which shall spread the water efficiently, is not liable to become clogged, and which may be operated at varying rates of speed, irrespective of the head or pressure of water from the main source.

SEWING MACHINE.—Edward Kohler, Oakland, assignor of part interest to H. P. Eayrs and M. Grunewald. Dated Jan. 16, 1883. No. 270,814. This is an improvement in sewing machines intended more especially for sewing heavy fabrics, such as carpets or bags. The invention consists in certain improvements in detail and various novel features of construction. In the sewing of bags by this machine the operation can be performed with great rapidity, because it is not necessary after finishing each bag to stop the machine and adjust any of its parts before commencing work on another bag. The machine will continue to form the interlocking stitch whether the fabric be in position below the presser foot or not, and any number of bags may thus be sewed and connected together by stitching, which may afterwards be separated as desired.

COOKING STOVE.—Charles H. Dunton, Oakland. Dated Jan. 16, 1883. No. 270,766. The improvements consist in the novel construction and arrangement of a round fireplace with relation to the stove, and in the employment of a vertically adjustable grate in the fireplace, together with a means of adjusting and holding the same. The heat from the fireplace acts upon the oven through its front wall, and also through the entire extent of its top, and at the same time is utilized for cooking on top of the stove. It is, therefore, well directed for its purpose, accomplishing its results with economy.

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During the war I was injured in the stomach by a piece of a shell, and have suffered from it ever since. About four years ago it brought on paralysis, which kept me in bed six months, and the best doctors in the city said I could not live. I suffered fearfully from indigestion, and for over two years could not eat solid food and for a large portion of the time was unable to retain even liquid nourishment. I tried Brown's Iron Bitters and now after taking two bottles I am able to get up and go around and am rapidly improving.

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J. W. A. WRIGHT—Merced, Tulare and Kern counties.
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E. W. CROWLEY—Los Angeles and San Bernardino counties.
L. WALKER—Sacramento, San Joaquin and Stanislaus counties.
N. H. HAPGOOD—Plumas county.
E. T. THURSTON—San Francisco.
A. C. KNOX—Santa Clara county.

Cash in Advance.

Our terms are cash in advance for this paper. NEW NAMES will not be entered on our printed list until payment is made. Feb. 1, 1883.

CHEAP ORE PULVERIZER.—There is for sale in this city as will be seen by our advertising columns, a second-hand Rutherford Pulverizer, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it.

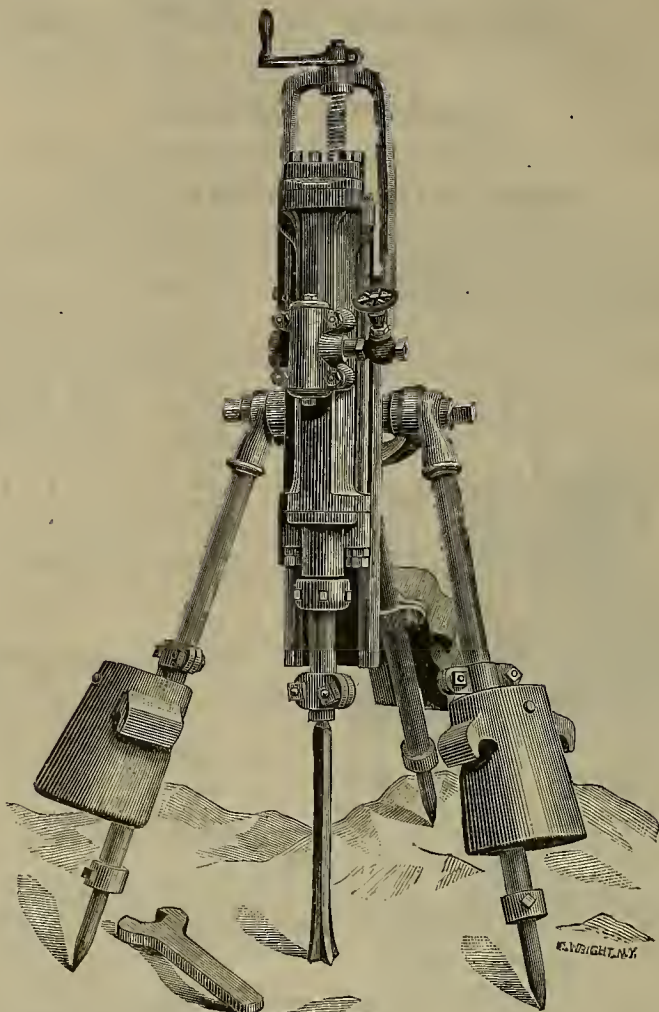
Leather.

WHOLESALE.

WEDNESDAY, M., Jan. 31, 1883.

Sole Leather, heavy, lb.	30 @ 32
Light	25 @ 28
Jodot, 3 to 10 Kil., doz.	36 00 @ 46 00
11 to 13 Kil.	50 00 @ 60 00
14 to 16 Kil.	55 00 @ 72 00
Second Choice, 11 to 16 Kil.	40 00 @ 65 00
Simon, 11 Kil., Females, 12 to 13 Kil.	52 00 @ 56 00
14 to 15 Kil.	60 00 @ 64 00
16 to 17 Kil.	66 00 @ 68 00
Simon, 18 Kil.	— @ 57 00
20 Kil.	— @ 60 00
24 Kil.	— @ 65 00
Kips, French lb.	85 @ 1 20
Cal. doz.	55 00 @ 60 00
French Sheep, all colors.	12 00 @ 15 00
Eastern Calf for Backs, lb.	1 00 @ 1 25
Sheep Roans for Topping, all colors, doz.	9 00 @ 10 00
For linings.	6 50 @ 10 00
Cal. Russet Sheep Linings.	3 00 @ 4 50
Boot Legs, French Calf, pair.	— @ 4 50
Good French Calf.	— @ 4 00
Rest. Jodot Calf.	4 75 @ 5 00
Leather, Harness, lb.	35 @ 40
Fair Bridge, doz.	45 00 @ 66 00
Skirting, lb.	33 @ 37
Welt, doz.	30 00 @ 36 00
Buff ft.	17 @ 20
Wax Side.	19 @ 20

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Mining Machinery.

For Catalogue, Estimator, Etc., address

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Wagoner & Hammond,
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Correspondence and samples solicited from parties having low-grade properties.

MINES REPORTED UPON.

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Redlands.

Good water, rich soil and magnificent view. High elevation, dry air, few fogs and norther.

No brush or fences on the land, which is especially adapted to the culture of the orange and raisin grape.

Near to church, school, store and depot. Hotel open. Telephone Communication.

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The price of land has steadily advanced from the first price of \$50 per acre until now it is held at \$200 per acre.

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SAN BERNARDINO, CALIFORNIA.

Dewey & Co. { 252 Market Street, } Patent Agts

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE Bulwer Consolidated Mining Company.

San Francisco, January 25, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 15, of five cents (5c) per share, was declared, payable on Monday, February 12, 1883. Transfer books closed on Friday, February 2, 1883, at 3 o'clock p. m. This dividend is payable at the Farmers' Loan and Trust Company in New York on all stock issued there, and at the office in this city on all stock issued here.

WM. WILLIS, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

STOCK DIVIDEND.

At a Meeting of the Directors —OF THE—

Gila Silver Mining Company,

Held this day, a Stock Dividend of Two Shares for each outstanding share was declared, deliverable on and after February 1, 1883.

J. T. McGEORGIEGAN, Sec'y.

NOTICE OF DISSOLUTION.

OFFICE OF THE

South Comstock Gold and Silver Mining Company, No. 309 California Street, San Francisco, California, January 18, 1883.

Notice is hereby given that, pursuant to the provisions of Title Six of the Code of Civil Procedure of the State of California, a meeting of the STOCKHOLDERS of the SOUTH COMSTOCK GOLD AND SILVER MINING COMPANY, a corporation organized and existing under the laws of the State of California, will be held on MONDAY the FIFTH (5th) day of FEBRUARY A. D. 1883, at the hour of TWO o'clock p. m. at said Company's office in room No. 4 of premises No. 309 California Street, in the City and County of San Francisco and State of California, to consider and vote upon the question of the voluntary dissolution of said Corporation and such other business as may properly come before said meeting.

By order of the President and Board of Trustees,
J. M. BUFFINGTON,
Secretary.

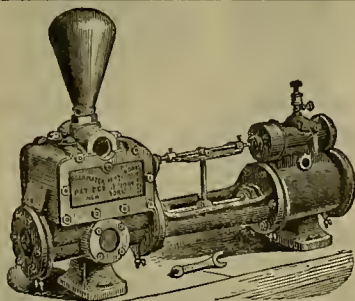
ASSESSMENT NOTICE.

Gould & Curry Silver Mining Company ASSESSMENT, NO. 44.

Levied..... January 10, 1883
Delinquent..... February 15, 1883
Day of Sale..... March 8, 1883
Amount per Share..... Fifty Cents

ALFRED K. DUBROW, Sec'y.

Office—Room 69, Nevada Block, 309 Montgomery St.



TATUM & BOWEN,

25, 27, 29 & 31 MAIN ST., SAN FRANCISCO,

187 Front St., Portland.

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Delemater Marine Engine and Pump Works.

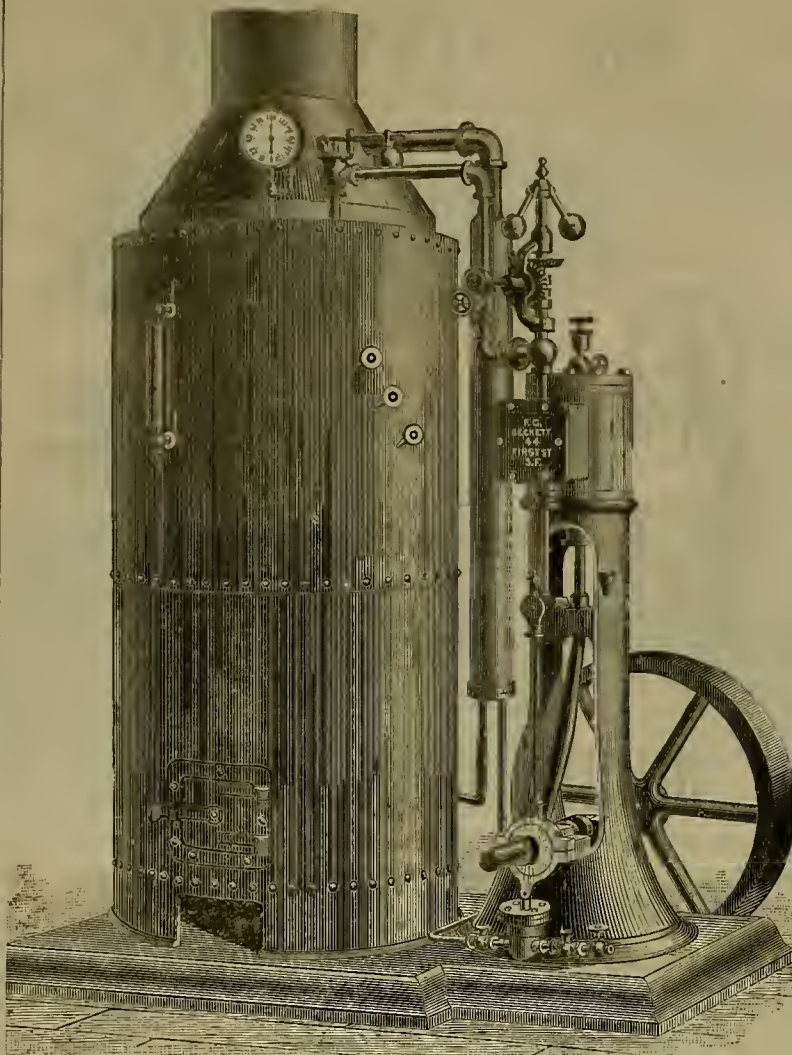
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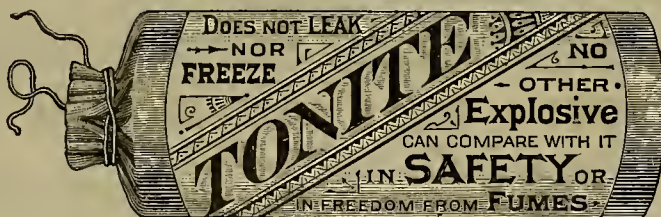
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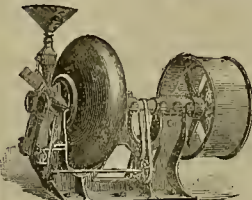
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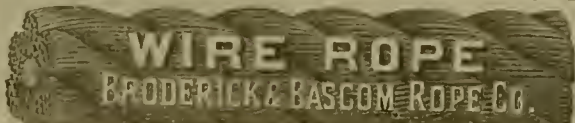


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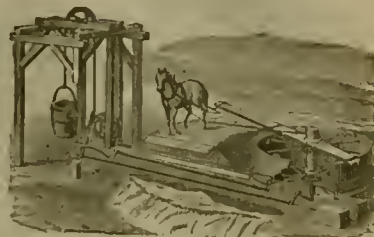
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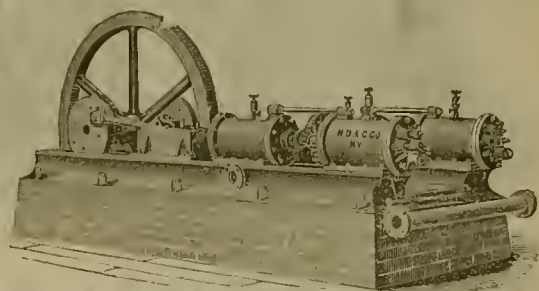
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Water Buckets,
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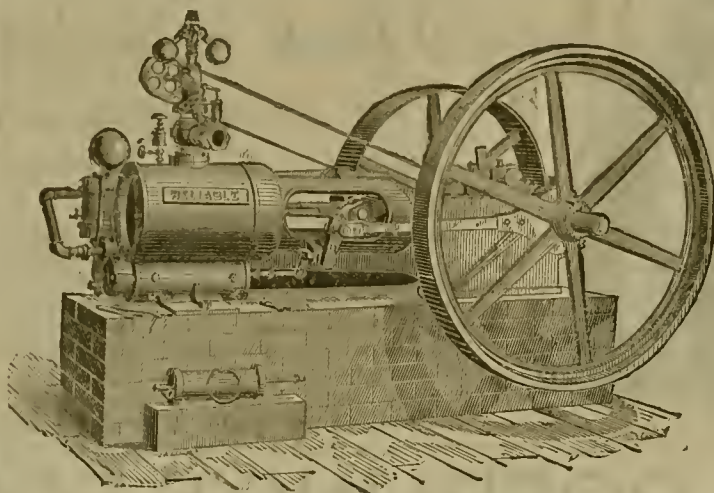
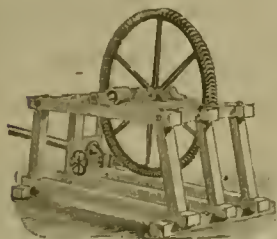
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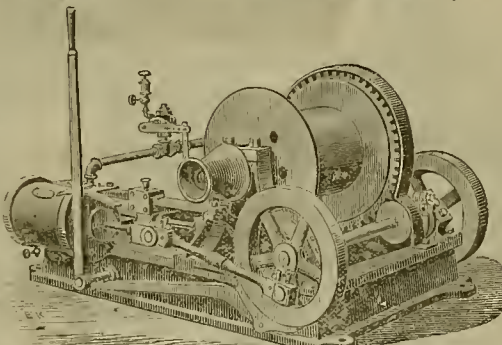
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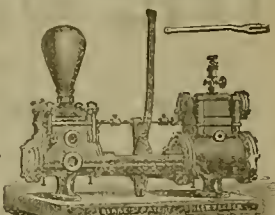
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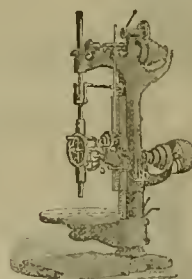
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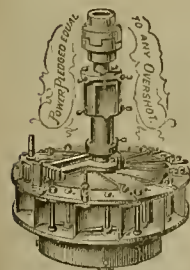
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- No. 1.—The most Powerful Explosive Compound now in use here.
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JUDSON POWDER

Is now used in all large Hydraulic Claims, and on most Railroads. It breaks much more ground, and obviates reblasting by breaking much faster. TRIPLE FORCE CAPS AND ALL GRADES OF FUSE.

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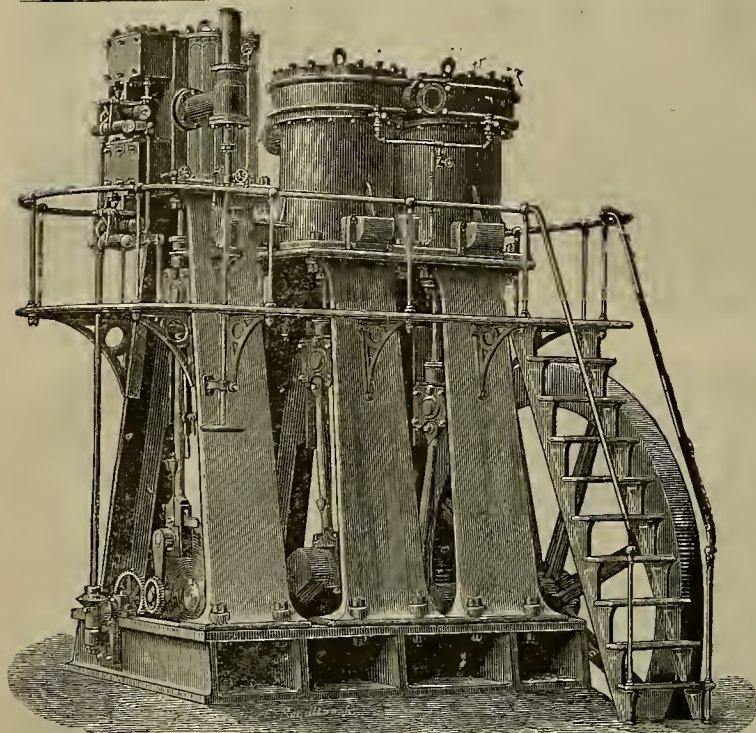
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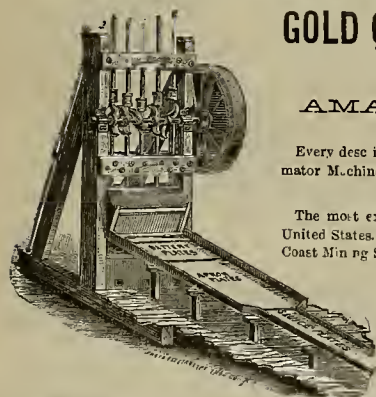


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SAN FRANCISCO, SATURDAY, FEBRUARY 10, 1883.

VOLUME XLVI.
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The State Mining Bureau.

While in other States and Territories associations are being formed for the purpose of collecting statistics and information about mines, and for erecting State or Territorial museums for the collection and preservation of ores, minerals, etc., in California, the oldest of all the mining States; the one that has produced the most bullion, and has been producing it the longest; whose mining machinery goes all over the world; whose methods and processes are everywhere followed; and which has a world-wide reputation as a mining region, the institution already founded, well under way and well equipped is about to be allowed to die for want of a beggarly appropriation which should be freely given.

Although many persons express themselves as friendly to the State Mining Bureau, measures for its relief are unsatisfactory, slow and indefinite. The Legislature refuses to add to the collection that already in existence at Sacramento, and so far nothing has been done towards making an appropriation to its support. Moreover, there does not seem to be any favorable signs of an appropriation being made.

The Bureau which was organized to foster legitimate mining has been compelled to exist on the proceeds of a tax on the transfer of mining stocks, which in itself was a ridiculous state of things. But now, that the mining stock business has dwindled to nothing, it cannot be kept up on that. For the last quarter the revenue was some \$1,700, which barely pays rent and the State Mineralogist's salary.

It has come to this, that if an appropriation is not made by the Legislature the Bureau must close. The collection will have to be packed up and stored until a more liberal spirit pervades the law-makers of the State.

It is, of course, but just and right that all sources of expenditure be closely scrutinized. In this instance, however, a committee has come down, examined the museum, and the members have expressed themselves to the effect that the institution is doing good.

It seems, therefore, as if something should be done to aid the Mining Bureau, or else abolish it altogether, and not let it drag on, half supported, and in a shape that its objects cannot possibly be accomplished. The friends of mining and of industrial progress in the Legislature should give this subject proper attention, and consider the claims the mining interests have to be properly represented before the people.

PATENTING BY A PART OWNER. A Colorado miner, who owned four-fifths of a lode claim and desired to have the same patented, but to which the co-owner refused his consent, asked the General Land Office how to proceed. He was advised "that there seems to exist no good reason why you may not institute proceedings for patent in the joint name of yourself and co-owner, either with or without his consent. You may be able to enforce contribution from such co-owner for his proper proportion of the expenses of patenting in the courts. You cannot receive patent for an undivided interest, and this office has no authority to compel a co-owner to join in an application."

PARTIES are still at work mining in the bed of the South Fork of Feather River, near Enterprise. They have not been disturbed by water this winter.

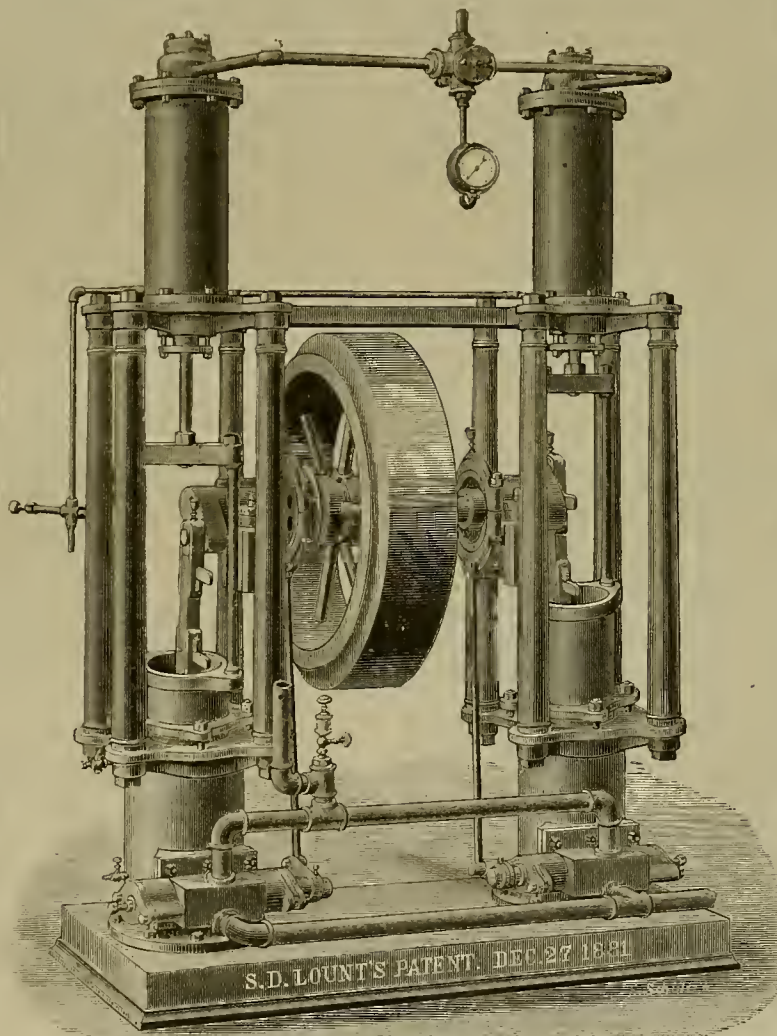
Manufacture of Ice.

There has been in practical operation in Phoenix, Arizona, for some four years past an ice machine invented by Samuel D. Lount, of that place, which has accomplished such good results that similar machines have been put at work at Globe, Arizona, Guaymas, Mexico and other places, and machines of larger capacity are now being made here.

These machines to which we refer can be made of any desired capacity. The first one put up only made 1,400 lbs. per day, but 10 or 15 or

or vapor it will soon be decomposed and fail to perform the service for which it is used, thus necessitating the frequent introduction of a fresh supply, and the advantage of keeping the wearing parts constantly bathed with a pure and cool lubricant will be readily seen.

This object Mr. Lount accomplishes by the peculiar arrangement of the compression cylinder and piston. The general appearance of a double machine, such as is now being made at the Etna Iron Works, in this city, is shown in the large engraving. Fig. 2, is a section of the cylinder of the pump.



COMPRESSOR FOR MINING WORK OR ICE MANUFACTURE.

more tons can be made. There is no new principle involved in the manufacture of ice. It is in carrying out certain details in an improved manner that constitutes Mr. Lount's claims on the new machine—details, which, in effect, make the manufacture of ice on the old principles much less expensive and less troublesome.

One of the main features in Mr. Lount's method is the peculiar compressing pump he uses, so constructed that the packing and the surfaces which are exposed to friction are not brought into contact with the compressed and heated air or vapor. Compressing pumps, when working under a heavy pressure, require abundant lubrication, and if the lubricant employed is allowed to come in contact with the heated air

or vapor it will soon be decomposed and fail to perform the service for which it is used, thus necessitating the frequent introduction of a fresh supply, and the advantage of keeping the wearing parts constantly bathed with a pure and cool lubricant will be readily seen. This object Mr. Lount accomplishes by the peculiar arrangement of the compression cylinder and piston. The general appearance of a double machine, such as is now being made at the Etna Iron Works, in this city, is shown in the large engraving. Fig. 2, is a section of the cylinder of the pump.

When the piston, *B*, is moved upward, the

air or vapor to be compressed is drawn from the outlet pipe, *E*, through the pipes, or chambers, *b, b*, into the space below the piston, and on the return stroke of the piston, the air or vapor passes through the cup inside the piston, and the valve, *C*, to the compression chamber above the piston, where it is compressed by the following stroke of the piston and forced through the valve, *D*, to the outlet pipe, *F*.

Now, the heat which is generated by compression, is all developed at the upper end of the cylinder, *A*. The upper and closed end of the piston, *B*, passes at each stroke through this heated chamber, but the packing ring, *pp*, being separated from this closed end by the thin wall of the cup, cannot become heated, for it will be observed that the interior of the piston, *B*, is always in contact with the uncompressed, and consequently cool air or vapor, which readily abstracts the heat that is conducted from the compressing chamber by the metal of the piston and cylinder, from the thin wall surrounding the cup, and also from the lower portion of the cylinder, *A*, after which it is transferred to the compressing chamber above before it can accumulate sufficient heat to decompose the lubricant or damage any of the parts exposed to friction.

The outlet pipe, *E*, does not communicate directly with the lower end of the cylinder, *A*, but through one or more pipes, *b, b*, which pipes terminate below the closed end of the cup-shaped piston, when said piston is at the lowest part of its stroke, thus forming a reservoir at the lower end of the cylinder, *A*, and this reservoir is kept full, or partly full, of any lubricating liquid which will not be disturbed by the air or vapor passing through the pump, and it will be kept at all times cool by the passage of the air or vapor through the said pipes, *b, b*. This liquid is always in contact with the piston-rod, and the lower end of the piston, *B*, and the packing ring, *p, p*, is immersed in said liquid at each stroke of the piston.

A compressing pump constructed in this manner does not require any water jacket, or the application of any cooling medium whatever, except the air or vapor which is forced through the pump; and another important advantage is that the treatment employed is always applied with certainty and in abundance to all the wearing parts, while said lubricant is not allowed access to the compressing chamber of the pump.

Mr. Lount has operated a pump of this description for compressing the vapor of ammonia to a tension of 120 to 180 lbs. to the square inch, continuously day and night, without ever having the piston rod or lower half of the cylinder at a higher temperature than blood heat, although the upper end of the cylinder was at a temperature much above the boiling point of water. With the machine just completed in this city, and running some little time, and compressing air to 200 lbs., the writer could feel the very great difference in this respect, the piston rod and lower part of the cylinder being merely blood warm. This pump was run at times under an air pressure of 340 lbs. with no special heat on the parts exposed to friction.

This in effect, is the compressing apparatus for compressing the vapors of ammonia. It can, as will be readily seen, be used for compressing air for mines, and some will be manufactured for this purpose by the Etna Iron Works Co., of this city. The general arrangement can be seen by the engraving.

(CONTINUED ON PAGE 96.)

Denver Exposition—No. 24.

(Editorial Correspondence.)

We conclude our series of letters on the Denver Exposition with a brief reference to Utah and Her Exhibit.

Discoveries of gold, silver, lead and copper in Utah were made as early as 1863, but the refractory nature of the ores, the great cost of transportation, and the opposition of the Mormon authorities to the influx of a general mining population, discouraged for many years any very extensive attempts to develop the mines. But the existence of a new and promising mining field, with favorable reports from enterprising prospectors, who always bid defiance to danger and natural obstacles, soon began to attract the attention of capitalists, by whom alone it was possible that the mines could be developed, and in 1870 operations on a large scale were undertaken. From that time to this the mining interests of Utah have been constantly progressing until now it is one of the leading mining fields of the Union, the reported yield of which, for 1882 was \$8,143,175 in bullion, which is an increase of \$789,000 over the report for the previous year, while the prospect of the future output of bullion is of the most promising character. The total output of Utah up to date has been about \$56,000,000, including lead.

Topographical Features of Utah.

Utah is divided nearly throughout its center by the main ridge of the Wahsatch mountains, which cross the Territory diagonally, into two nearly equal divisions, from its northeast to its southwest corner; the eastern portion is drained by the Colorado river, while the western has a drainage peculiar to itself, with no outlet to the sea, but either centering in Salt Lake or sinking in the desert sands of the "Great Salt Lake Basin." The Wasatch mountains seldom reach the perpetual snow line, and are much lower than the Rocky mountain divide in Colorado. Nearly every portion of this mountain range, with its spurs upon both sides, is rich in minerals. The extent of the mineral region cannot be less than some 600 miles, in a diagonal direction through the State, by an average breadth of from 150 to 200 miles, affording a vast and promising field for the prospector and miner. Throughout this extent of country not less than 80 mining camps or centers of that industry have been established.

The Mines of Utah

Are everywhere being thoroughly developed and energetically worked. Railroad facilities are being introduced to further facilitate development, and capital is coming in freely for all needed purposes. A large number of reduction works have been erected at important centers, and others are being erected or projected as rapidly as the nature of the developments in progress seem to warrant. The chief mining points are Park City, Cottonwood, American Fork, Saady, Bingham, Tintic, Stockton, Frisco and Silver Reef.

Park City, which leads the above list, is also the leading mine of Utah, and one of the few great mines of the world. This mine was fully noticed in our mining review of last week, as were many other leading mines in the Territory, hence particular reference to individual mines is not needed in this connection.

The Sandstone Mines

Of Washington county form one of the most interesting features connected with mining in Utah. These mines have attracted much attention from mining experts and scientists in general. The exhibits from these mines at the Denver Exposition were very interesting and suggestive. The occurrence of silver in sandstone at this locality has very much modified the opinions of geologists in regard to the deposit of the precious metals. But as these mines and the philosophy of their mineral contents has already been fully discussed in past issues of the MINING AND SCIENTIFIC PRESS, there is no occasion for its repetition here.

The Utah Exhibit.

The display made by Utah was one of the most complete and best arranged in the building. In extent it comprised over 200 packages, and in bulk it filled about two cars. The exhibition was well arranged, classified and labeled with good taste and intelligence. The selection of Professor Clayton as Commissioner was fortunate, as no other man in the Territory was so well fitted for the position as the Professor. He was most ably assisted by Mr. A. Zeenlehar, formerly of this city, but for several years past a resident of Utah.

The display of silver in sandstone and petrified wood attracted much attention. In addition to the precious metals shown there were also fine specimens of coal, sulphur, marble, gypsum, iron, lead, copper, etc.

Antimony, Bismuth, Sulphur, &c.

Among the exhibits was a collection of beautiful specimens of antimony from the American antimony works, at Salt Lake, assaying as high as 71.32% of antimony, carrying 28.13% of sulphur, with scarce a trace of arsenic, lead or any of the other substances which usually deteriorate this ore. The formula for pure sulphide of antimony or stibnite is antimony, 71.4; sulphur, 28.6. The company own a group of 25 claims in Coyote district, Iron county. They showed a single specimen which weighed about 3,000 pounds, and assayed 60% of antimony. They also exhibited three cases

of their manufactures in metal and fine material from their manufactory near Salt Lake.

Cinnabar was shown from the Geyser mine, Tooele county. Sulphur was shown almost pure from the immense beds of that material in Beaver county, one specimen weighing over 500 pounds.

Native sulphur, with vein formations carrying about 30 ounces of silver and \$2 in free gold per ton, was shown from a mine in Bingham county. Specimens of bismuth were exhibited containing as high as 50% of that metal, and 630 ounces of silver to the ton of ore. This class of ore is found in several localities at Tintic, Detroit, Granite, etc. Bismuth is beginning to be an important metal for use in the arts, and has hitherto been imported from Europe. There is no doubt but that in the near future the Tintic mines will furnish an abundant supply. Utah, as all the world knows, abounds in salt. It occurs there in mountain masses, and the Salt Lake contains enough, perhaps, for the supply of the world. Of course, this article was not overlooked on account of its abundance. Some beautiful specimens were shown.

Sulphate of soda (glauber salts), a by-product in the manufacture of salt, was shown in quantity. Black shell marble from near Salt Lake was shown, also white and mottled marbles from San Francisco mining district, Detroit mining district, Provo valley, Wasatch mines and Preuss mining district. Those marbles are beautiful and very suitable for building, mantels, statuary and sculpture. The Utah quarries are immense, and there is enough in sight to furnish marble fronts for all houses on this whole Western slope.

Gypsum of excellent quality from several locations was shown. There are large deposits of this material in various parts of Utah. Excellent building stone from the freestone quarries in San Pete county and several other localities were shown.

Bituminous slate and other rocks saturated with oil were shown, together with the somewhat rare mineral, cerite—mineral wax—was also on exhibition. These minerals are said to exist in large quantities in some parts of Utah, although they have not as yet been developed to any considerable extent.

Copper.

The Tintic mountains contain vast storehouses of mixed copper, gold and silver ores, which are reduced to matte by the furnaces of the Mammoth Mining Co. in Tintic valley, under the general management of Mr. W. H. H. Bowers, a thoroughly educated and eminently practical mining and mechanical engineer. The Utah Western railroad passes through these mountains, affording abundant means of transportation. It is said that a few miles west of this locality, and near the eastern boundary line of the great desert, a mineralized zone extends for 60 miles east and west, containing true fissure veins, carrying mixed copper, silver and gold, compared with which the copper mines of Chili and Lake Superior will some day fall into insignificance.

Coal.

The coal fields of Utah were also represented. Those fields are very extensive, occurring at intervals throughout the entire slopes and plateau of the great dividing ridge of the Territory—the Wasatch—from its northern to its southern border. These coal fields embrace thousands of square miles, and contain coal in abundance for years to come. The geological era to which they belong is an open question. They have been pronounced by "coal experts" as belonging to the Cretaceous and Tertiary eras, and are largely lignites. A. P. Bouton, M. E., reporting on the coal veins of the San Pete valley, says: "The coal is of a dark brown color, highly stratified, as it is naturally would be so near the surface, having been exposed for vast ages of time to the oxidizing force of nature, carrying in their lines of fracture their scales of sulphate of lime, increasing the percentage of ash. These mineral salts must of necessity prevail here, being deposited by water carrying minerals in solution. The salts disappear very rapidly in going in on the veins, and in proportion as you get beyond the brecciated rocks overlying the outcrop, through which these mineral waters have been filtered. Samples obtained about forty feet from the surface, by analysis yield as follows:

Moisture	1.8
B tumen	34.2
Coke (exclusive of ash)	50.7
Ash	13.3
Total	100.

The above analysis indicates a very superior bituminous coal. It yields a coke but little inferior to that obtained from the best Cumberland coal. In addition to the above the coal measures of Pleasant valley and Castle valley have been quite extensively developed, and are said to be of a very superior character. These three deposits are nearly in the center of the Territory, just south of Salt Lake City, and near to the line of the Denver & Rio Grande and the Utah Central railroads—the former passing just east and the latter just west of the mines, and with both of which they will all soon be connected by branch railroads. A branch has already been constructed to the Pleasant valley mines.

Iron.

The iron deposits of Utah are immense. They form whole mountains, and have been pronounced by good authority to be among the most remarkable deposits of that mineral on the continent. Save the spathic, all the ores of iron occur in Utah everywhere, the heaviest and richest deposits being in Iron county. Hematites

and magnetites crop out there in a belt two miles wide and 16 long in great masses. One called the "Blowout" contains 3,000,000 tons in sight. Prof. Newberry, after analyzing, says many of the deposits are first-class Bessemer ores. Water and coal are plenty and convenient, and wood for charcoal. Important iron deposits occur at Tintic, in Cache valley, about Ogden, and in other localities. The establishment of

Metallurgical and Smelting Works

In Utah has been entered upon on a large scale, and already forms a feature of prominent importance in the present, which must soon be largely increased for the future development of the industry into permanent prosperity. The ores and fuels are in quite close juxtaposition, while water and timber are also found in abundance.

The great smelters not directly connected with mines are the Germania, the Hanauer, the Mingo and the Mammoth Mining Co.'s works at Tintic, already alluded to. In addition to these another large smelting company is about being organized in the Tintic Valley for the reduction of the ores of the Tintic mountains. The increasing demand upon the smelting works of Utah may be inferred from the last reports of the Germania smelting works. The refined lead turned out by those works in 1881 was 1,323 tons; in 1882 it was 4,107 tons. The Hanauer furnace produced 1,508 tons in 1881 and 2,801 tons in 1882.

The Future of Utah.

It requires no prophetic gift to foretell the advent in the near future of an era of great prosperity and increase in the mining industries of Utah. The day of prospecting has comparatively passed away. Development and permanent work is now the order. Her coal fields may be measured by townships and almost by counties. Her iron ores are rich and abundant. Indeed, the entire basin of Utah has been a vast laboratory, where the grand processes of nature have been carried on for countless ages upon a most extensive scale, even for nature's work, and perhaps nowhere else on the globe equalled in extent and variety. Among the results we have, besides gold and silver, copper, lead, iron coal, antimony, bismuth, cinnabar, sulphur, marble, gypsum, salt, soda, oil, mineral wax, etc. The climate of Utah is singularly mild, which, with the abundance of agricultural land rich and well watered or favorably located for irrigation, will enable her population, even when it reaches millions, to produce their own breadstuffs to a large extent, while her extensive plains offer pasturage throughout the year for immense herds of sheep, cattle and horses. In short, Utah has natural resources which must eventually place her in the very foremost rank in the grand array of American States.

W. B. EWER.

Hydraulic Pumps.

The Eureka Machinery at Work.

Our regular correspondent at Eureka last week visited the new works of the Eureka Consolidated mine, in company with Superintendent Read, and sends us the following description of the hydraulic pumping machinery:

We were supplied with rubber clothing, and getting aboard of "Jumbo," were lowered to the bottom of the immense shaft. Here we stood for a while watching the men at work, standing a foot deep in water and streams pouring down on our heads. It was coming into the shaft at the rate of 200 gallons per minute. Here the necessity of heavy machinery is quite apparent. It has been supplied, and is proving all that has been claimed for it. The main feature of the new machinery is

The Hydraulic Sinking Pump.

It will be remembered that during the discussion between engineers some years ago as to whether hydraulic pumping machinery could be successfully introduced to drain the flooded mines on the Comstock, the point was maintained that while hydraulic machinery was suitable for ordinary pumping purposes, it would be impossible to operate a sinking pump by hydraulics, and that even if the latter were introduced the sinking pump would still have to be worked by the old spear rod system. Mr. Joseph Moore, of the Risdon Iron Works, San Francisco, took exceptions to this view, but at that time had no opportunity of putting his ideas into practice. Since then, however, he has drawn designs for and patented the sinking pump now successfully working at the Eureka Con. Mine. In the absence of drawings which I have seen, but unfortunately cannot present, a brief description of the manner in which it is operated will be interesting.

The pump proper follows the shaft down on vertical guides, and the motion to its plunger is transmitted by means of a set of actuating rams situated on the 600 level. The sinking pump consists of two cloisters of three cylinders each, the plungers of which are attached to a single crosshead between each set of cylinders; the cylinders, three in number, as stated, are lying side by side, with the working barrel of the sinking pump in the middle, and the pressure rams on each side of it.

On the 600 station are the actuating rams, consisting also of three cylinders lying horizontally side by side, the center one being the power cylinder, and the two on either side being connected by pipes to the side rams of the sinking pump. Now, in order to give motion

to the latter, the actuating rams on the 600 station are started, and we have in motion a column of water working upwards and downwards, carrying with it the plungers of the sinking pump. The latter, therefore, consists of no more mechanism than three plain cylinders that are entirely operated from the 600 station. The advantage of this system has been recently illustrated. During the last three months, through which time the new accumulator was in course of erection, the entire machinery stood idle, and the sinking pump, at a depth of nearly 1,000 ft. below the surface, became entirely submerged. As soon as the erection of the new accumulator was completed, and the pressure raised within it, the sinking pump was started from the 600 station by the pressure being admitted to the actuating rams, and in a few hours the shaft was drained.

The sinking pump, which had been out of sight for a period of three months, came to view again, unimpaired and in as good condition as ever. By means of a small valve the whole pump can be raised or lowered as required. When the miners are ready to discharge a blast, it is raised clear out of the way of flying rocks, and as soon as it is safe to do so, it is again lowered into place at the bottom of the shaft, and pumping is resumed without further interruption. No time is lost. The whole thing moves like clock-work, and is remarkable for its easy motion. The miners, heretofore prejudiced in favor of the old-style Cornish pumps, now universally acknowledge the superiority of the present arrangement, and to the credit of the Pacific coast be it said, that it remained for one of its engineers to design and successfully start into operation the first and only hydraulic sinking pump in the world. As it is from an original design by Mr. Moore, and not yet known as it deserves to be, I am informed that a thorough description of its main features will hereafter be given for publication.

It receives water under a pressure of one thousand pounds to the square inch, and when lowering the movable cranks are run towards the center, when the water is forced back into the accumulator and stored under pressure until ready for hoisting. By this means the moving mass when being lowered is made to store up power for the return trip, thus utilizing the power which in other hoists is wasted by the common hand brakes.

Big Hydraulic Mines.

The North Bloomfield and Milton hydraulic mining companies operating in Nevada county have made their financial statements for 1882. From them we gather these figures:

NORTH BLOOMFIELD.

Receipts.	
Gold bullion	\$386,146 23
Water sales	2,899 12
Dividends from branch companies	42,885 50
Personally reduced	4,059 80

Total receipts	\$436,000 65
Disbursements.	
Bonds redeemed, 106	\$106,000 00
Interest on bonds	37,075 49
Expenses of mining	153,714 03
Dividends	135,000 00

Total disbursements	\$431,789 52
Increase in cash assets	\$4,211 13
Showing net profit in working the North Bloomfield mine proper of \$235,331 32.	

MILTON.

Receipts.	
Gold bullion	\$416,044 17
Water sales	1,425 66
Personally reduced	11,759 05

Total receipts	\$429,228 88
Disbursements.	
Bonds redeemed, 50	\$50,000 00
Interest on bonds	12,818 83
Improvements on other property	12,908 07
Expenses of mining	236,592 53
Dividends	88,424 00

Total disbursements	\$400,743 40
Increase in cash assets	\$27,485 48

Showing net profit in working the Milton mines of \$180,877 30.

As these properties are among the leading hydraulic gravel mines in the State, the following tabular statement, showing their operations for the past six years, will be of interest:

	Bullion	Water
	Product.	Sales.
1877	\$670,774	\$ 6,754
1878	849,036	9,694
1879	794,518	9,091
1880	665,711	12,395
1881	637,682	24,433
1882	602,190	4,325
Totals	\$4,219,911	\$ 66,492
	Net profits.	Dividends
1877	\$ 364,045	\$ 45,000
1878	501,181	481,498
1879	462,821	422,640
1880	264,075	105,396
1881	325,227	.....
1882	416,209	223,224
Totals	\$2,333,558	\$1,290,758

These mines were closed by injunctions for four months during the year 1881, which accounts for the small product of that year. At the beginning of 1877 the two companies were in debt over \$1,000,000. Since then this debt has been reduced to \$344,000. These payments and interest on this indebtedness chiefly account for the above discrepancy between profits and dividends.

MECHANICAL PROGRESS.

A Year's Metallurgical Progress.

The year 1882, says the *Ironmonger*, cannot be said to have been signalized by any single metallurgical discovery of a startling nature; still, it has not been an idle twelvemonths for our metallurgists. Nothing of a revolutionary character has been brought into existence, yet a good deal has been done in the way of economy and improved results under former conditions. Every succeeding year brings an enlargement of the means of production in all the principal manufacturing countries, so that the aggregate capacity of the world is growing at a rapid rate—probably faster, indeed, than the necessities of consumption require. With the augmented number and powers of the producers there is a natural growth of competition, which forces each individual manufacturer to adopt processes and economies which were not only unheard of, but quite unnecessary, a few years ago. The cost of production, therefore, is incessantly undergoing minimization, so that the selling rates of any former period afford no reliable criterion as to the profits of the time being. There is scarcely a single department of metallurgy which forms an exception to this general rule. It is especially true, however, of the iron trade proper, in which progress is the *sine qua non* of every manufacturer who wishes to hold his own.

Blast furnace practice furnishes a conspicuous illustration in support of this statement, seeing that by the construction of higher furnaces, the adoption of improved ovens for heating the blast and the utilization of the waste gases, the consumption of fuel has been immensely economized and the output much enlarged. This saving is being effected concurrently with a much larger output of pig iron.

The greatly enlarged make of special materials, such as ferromanganese or spiegel-eisen, is also noteworthy, especially when it is borne in mind that fixed percentages can be turned out with the utmost regularity and certainty. The efforts of our metallurgical chemists in this direction have been attended with so much success that we are not wholly independent of German supplies, but are doing a considerable export trade to the United States.

Direct processes of iron making are heard of more or less frequently, the latest claim in that respect being made on behalf of Mr. Bull; but we have not any tangible evidence as yet that the practice of that gentleman is likely to upset the existing methods of iron making, particularly as there can be no question that the so-called "direct" processes of Heaton and other inventors were in many respects meritorious and deserving of greater achievements than have been recorded in connection with them.

In regard to mechanical puddling, but little in the way of progress has been heard during the year. In Great Britain the human puddler is still a prime factor in iron making, but in this country both the mechanical and the human puddler seems in a fair way to lose their vocation, as experiments in Pittsburgh and Wheeling recently given in these columns seem to show, that nearly every grade of iron can be made by the converter. We condense from the *Ironmonger* as follows:

In rolling mill practice all the changes of the year seem to have been of a minor character. In this country experiments have been made for using alternate perpendicular and horizontal rolls, whereby it is claimed that loose rolls and the need for reversing is obviated.

As regards Bessemer working, it may be noted that the method of taking the metal direct from the blast furnace, to the converter, and thence to the rolls, is coming more in vogue. The soaking-pit process, introduced by Mr. Giers, has been very successfully worked at several places, and is likely to be extensively adopted, as being of the greatest utility in point of keeping the ingots sufficiently hot to permit of their rolled products turning out sound, the prices of the day rendering the avoidance of all intermediate processes a matter of stern necessity for all the rail makers. For general purposes Bessemer steel is apparently in constantly growing request, a result which is largely owing to the regularity and certainty with which the material can be obtained with any given percentage of carbon.

The Thomas and Gilchrist basic process has been more widely adopted in Europe, and, though skeptics yet doubt the success of the process, the evidence in its favor is overwhelming and there is no reasonable doubt of its future. Minor improvements are being made to this process, which are giving it increased value.

In all branches of the steel trade attention is being accorded to the effects of gases upon the materials, but the experts are not quite at one upon the subject, which is still under discussion by M. Pourcel, Dr. Muller, R. Snelus, Mr. Windsor Richards and other eminent men. There can be no doubt that the theme is most important, inasmuch as the causes which lead to the honeycombing of Bessemer ingots are, no doubt, similar to those which produce air-holes in ordinary iron and steel castings.

The method of tempering steel by means of enormous hydraulic pressure, suggested by M. Clemandot, a French scientist, has attracted much attention, and possesses certain features which will probably cause it to be more prominent shortly. Its especial merit seems to consist in the forcible expulsion of the gases, the

presence of which is generally admitted to be highly prejudicial to all metals.

Seguin, of Paris, has patented a process for increasing the tensional, torsional, etc., strength of iron by immersing it in hot dilute sulphuric or hydrochloric acid, but we have since heard little of the invention, and virtually know nothing in this country of its practical results. The utilization of tin-plate scrap has been spoken of in several quarters by means of oxidation and other processes, but the matter scarcely seems to have attained commercial proportions as yet. Blast-furnace slag is being more largely used for brick-making and other purposes, including the manufacture of glass and so-called wool. As regards the other metals, nothing of great moment has transpired.

An alleged discovery as to aluminum has been quite lately heard of from Birmingham, where it is said to have been in existence more than a year; but all that is claimed for the invention is not by any means admitted by those who have studied the matter. The problem of separating alumina from the oxygen with which it is combined has hitherto baffled the many clever chemists who have attempted to solve it; consequently the discovery made by Mr. Webster will prove of immense value if it equals the claims made on its behalf. In copper, tin, lead, spelter, etc., few alterations of note have taken place, albeit numerous minor improvements have been effected.

The hollow application of Bessemerizing to copper does not seem to have made so much noise in the world as had been expected by its advocates, but the separation to metals by electrolysis, as also electro-deposition, have steadily marched onward. Considerable progress has been made in respect of the working and applications of nickel. An English firm have produced malleable nickel and cobalt by adding a flux of metallic manganese to the fluid metal a few minutes before the casting.

The more exact and symmetrical testing of materials of all kinds has also been discussed of late on both sides of the Atlantic, and it seems probable that steps will sooner or later be taken to establish a system which shall be satisfactory at once to the manufacturer and to the inspecting engineer or contractor. At present many of the tests prescribed by the engineers are absurd, and inflict serious losses on manufacturers who honestly endeavor to supply a good article for the purpose indicated by the specifications submitted to them. Some day, perhaps, it may be found practicable to agree to standard tests for specific purposes, in substitution for the labyrinth of requirements now obtaining for precisely the same article.

Dispensing With Puddlers.

We have already made mention at length of the way puddlers are being dispensed with at the Wheeling rail factories by substituting mild Siemens steel instead of iron in the manufacture of nails. And now comes the Pittsburgh *Dispatch* with the following:

The experiments which are being conducted at Glenwood station in the manufacture of iron direct from ore are reported by those interested to have been attended with success. An eye-witness affirms that the newly patented Adams furnace is capable of making a heat of sponge ball ready for the muck rolls direct from the ore every hour. One charge that was timed was recorded by Mr. Wm. Pillow, an experienced iron worker, as having been "brought to nature," a term used by iron men, in 30 minutes, and in 10 minutes more was made ready for the muck rolls. The product when finished was pronounced by experienced puddlers who were present to be equal to the best puddled iron known as merchant bar. The furnace is a sort of combination of the Siemens rotary and the Purley furnaces, both of which were designed for the purpose of converting native ores directly into iron. They were each successful in a measure, but were found to be unwieldy and impracticable. The new process, if it continues to be successful, will seal the fate of puddling. The designer of the new furnace claims that he has a large number of orders for the new furnace, the validity of which will be based upon the result of the present experiments. Among those mentioned were Demmler Bros., who want 30 furnaces to do just the work which Mr. Adams claims his furnace will do. "It would be a novel sight," said a witness of yesterday's operations, "to see a train load of ore come into a mill and go away in an hour afterward in the shape of bar of iron in the same cars."

WOOD VS. IRON IN FIRE.—The London *Telegraph*, speaking of the recent great fire in that city, says: "It is of interest to notice the effects of intense heat like this on different constructive substances. There has been a tendency of late years to trust to iron; but yesterday's test was altogether unfavorable to this substitute for wood. An experienced officer of the fire brigade remarked: 'Whenever we know there are iron girders and pillars we give them a wide berth. They expand so much that you can never be certain of them. Take a floor resting on wooden beams, say 12 inches by 8. It will burn for hours without giving way, and will not swell at all, and not displace any part near it. Not so with iron; it soon becomes red-hot, expands with terrible force, and, as I think, does more harm than good.' This view was confirmed by the fact that buildings like the Curriers' hall, the rear walls of which were subjected to a terrible scorching, escaped with little damage, while in no case did an iron partition seem to be of avail."

SCIENTIFIC PROGRESS.

What The Telescope has Done for Astronomy.

The foundations of physical astronomy were laid in the invention of the telescope. Everyone has heard of the emotion which filled Europe at the announcement of the discovery of an instrument which had the power of making distant objects appear as if they were near. It was at that time that Galileo, having only learned that such an instrument existed, discovered its arrangement, constructed one, turned it toward the sky, and, with this aid, fertilized by his genius, made a series of magnificent discoveries. These discoveries belong pre-eminently to physical astronomy, and form its first courses. If we except the sun and moon, which have a very sensible diameter, and admit of some observations without the aid of the telescope, all the stars appear to the eye only as brilliant points, and admit of no studies except of their motions. Therefore, an astronomy without the telescope would never have permitted us otherwise than as a matter of probability to consider the planets as like the earth in form, constitution and office. But when it was seen that these brilliant and almost blazing points were resolved under the telescope into well-defined disks, showing indications of continents, clouds and atmospheres, when satellites were perceived around those globes playing the same part to them as the moon plays to the earth—then probabilities gave place to a clear certainty. Telescopes, then, are the instruments by means of which the constitution of the solar system has been definitely unveiled, and the earth has been assigned its part and its rank in the system of planets. The discovery of the spots on the sun and of its rotation completed the conception of the solar systems and prepared for the theory of its formation. Here is marked a well-determined phase in the history of human ideas respecting the universe, and it is characterized by the great name of Galileo.

Was it possible at once to go beyond this? Was it possible to question the stars in their turn, and inquire if, like the sun, they had a sensible disk, spots, a rotation, and planets revolving around them; was it possible, in short, to extend to the stellar universe the notions we had already acquired concerning the solar system? The methods in use did not yet permit this.—*Popular Science Monthly*.

The Luminosity of Flame.

Considerable discussion has been indulged in with regard to the cause of the luminosity of flames, and still the question is far from a settlement in which scientists can generally concur. The editor of the *Machinist and Builder*, assuming that the luminosity in question has reference more particularly to luminous hydro-carbon flames, of which the flame of the candle or of burning gas is the representative, remarks that though there is still some question concerning it, the weight of opinion is decidedly in favor of the view that the luminosity of such flames is caused by solid incandescent particles of carbon. This is the old theory, which was accepted for years without question, until Frankland challenged its correctness and endeavored to prove that the light-emitting material of such flames was highly heated vapors of more or less density.

The whole subject, however, has lately been reviewed by Henmann, who reaches the conclusion that the old explanation is the correct one. With this conclusion we fully agree. The proofs which Henmann offers are: 1st. The increased luminosity which chlorine imparts to weakly luminous or non-luminous hydro-carbon flames, which is due to its well-known property of separating the carbon as such. 2d. A rod held in a flame is smoked on the lower side only—that is, the side opposed to the issuing gases; were the carbon there in the form of vapor, as Frankland assumes, it should be condensed by the cooling action of the rod and deposited uniformly all around it. 3d. A body held in flame is smoked, even when it is in a state of ignition; this therefore cannot be explained by a condensation of vapor. 4th. The carbon particles can be actually seen in the flame when it is made to strike against a second flame, or an ignited surface, the carbon particles aggregating together to form visible masses. 5th. The luminous portion of a flame is not very transparent—no more so than the layer of smoke of the same thickness which rises above a flame fed with turpentine. And 6th. Flames which unquestionably owe their luminosity to the presence of solid particles, give a shadow with sunlight, precisely as do hydro-carbon flames; while luminous flames composed of ignited gases and vapors only, give no such shadow in sunlight.

THE SUN'S DISTANCE.—Calculations, based upon the several observations taken during the last two transits of Venus, have nearly, if not quite all, resulted in reducing distance which has been supposed to exist between the earth and the sun. Our works on astronomy formerly made the distance about 95,000,000 of miles. Most of the estimates eight years ago made it about 93,000,000. Approximate figures from the last transit have reduced the distance to less than 91,000,000.

Chemistry of the Electrical Accumulators.

With the attention that is now directed to the storage of electricity, the following description of the chemical action of the Plante and Faure accumulator as given in a German exchange will not be without interest:

If a plate of lead, coated with a little peroxide of lead, be placed in sulphuric acid, it will soon become covered with sulphate of lead as a result of local currents between the peroxide and the lead, or by simple chemical solution, so that in Plante and Faure's battery the peroxide is gradually destroyed *independently* of the main current. This action takes place very slowly, because the sulphate of lead is deposited between the lead and the peroxide, and hence greatly diminishes the local current. If no sulphate of lead were formed, the peroxide of lead would soon be all consumed. The sulphate of lead is subsequently reduced by the hydrogen, forming spongy lead. By repeated charging, the quantity of finely divided substance increases.

In a similar manner, if two electrodes that are covered with sulphate of lead be immersed in dilute sulphuric acid and a current passed through them, one will become covered with spongy lead, the other with peroxide formed from the sulphate.

The peroxide formed upon the positive lead plate of the secondary battery becomes covered with a comparatively impenetrable layer which prevents the further production of peroxide; hence Plante leaves his battery at rest, which favors this formation of sulphate of lead.

In this way all the sulphuric acid can easily be taken out of the solution. A considerable quantity of oxygen—more than half—will not be absorbed. According to Kabath, the interior plates of lead foil are rapidly crumbled, but the particles remain hanging between the outer plates.

ELECTRICAL PROGRESS.—Scarce a month goes by without some important advance in electricity in some one or more of the various purposes to which it is applied. Now it is the telephone that is improved; next the dynamo machine; then the electric light, and again the storage battery, and so on. A late correspondent of the *New York Letter* says: "In the office of the scientific expert, Park Benjamin, I saw yesterday an invention which may be the electrical sensation of 1883—a cheap battery, which, for small motors fit for sewing machines, lathes, etc., surpasses our present cell batteries as 50 to 1. Every person dealing with electricity knows the Grenet battery, a bottle containing a solution of bichromate of potash and sulphuric acid, into which are plunged a piece of carbon and a piece of zinc. The electric current produced is strong, but at the end of 24 hours the solution has lost its strength and has to be replaced. For this reason the Grenet battery is only used when a current is needed for a few moments; the zinc is so arranged that it can be plunged into the liquid and lifted out again by working a small rod. Mr. J. M. Stebbing, of this city, patented last year a modification of the Grenet cell, in which, by the simple introduction of a dividing plate of porous material, the solution remains unimpaired and the battery goes on working for six months, or until the zinc is consumed, instead of giving out at the end of 24 hours. Tcs's have been made by different experts with the batteries, and they have fulfilled all that the inventor claims for them. A company has been formed for their manufacture and sale, and they will be put upon the market very shortly. Each cell occupies about the space of a hat box. Four cells will run a sewing machine, and six will run an incandescent lamp; the cost for each cell will be about three cents a month. Experts say that if half of what is claimed can be done, there will be no more use for dynamo machines or storage batteries."

ELECTRO FLUID AND FIRE BATTERIES.—We have already noticed in these columns the electro fuel and fire batteries of Dr. Brand. That gentleman is still prosecuting his researches in this direction. His latest production is reported to be a torch or candle, which in burning produces an electric current. As described by *Engineering*, of London, England, it is made by compressing a paste of coal dust and treacle in a mold along with two wires which issue from one end and serve as the negative electrode. The stick thus obtained is wrapped in a thin sheet of asbestos paper covered with copper wire to serve as the positive electrode. The core is then dropped into a bath of fused nitrate of potash until a layer from .2 to .25 inch thick adheres to it. In the candle thus obtained the carbonaceous agglomerate forms the wick and the nitrate takes the place of the wax or tallow. On setting fire to the wick it continues to burn, and on connecting the wires to a galvanometer a current will be observed during the whole time of combustion. This current is not very regular, however, owing to a crust of nitrate and to the resistance offered by the wires. It is stated that ashes mixed with the nitrate, in the proportion of two parts of ash to one of the salt, cause the candle to burn more regularly, and to give off a remarkably steady current.

FORTY-NINE electric light companies, with \$81,390,000 capital, were set agoing in Great Britain last year.

MINING SUMMARY.

THE Noonday, North Noonday and Red Cloud mining companies, Bodie, have gone into voluntary insolvency. The Court below found general orders staying proceedings against them; also special orders directing the Sheriff at Bodie to proceed no further in execution against them.

MANMOTH.—*Ledger*, Feb. 3: This quartz claim, formerly known as the Spanish gulch mine, is located on the ridge between Murphy's gulch and the Mokelumne river, about half a mile from Middle Bar and 3½ miles south of Jackson. It is at present entirely owned and worked by W. A. Nevills, who, for 5 or 6 years past, has done considerable prospecting in this section of Amador county. In the Mammoth lead the indications are that the richest bonanza ever discovered in the county has been encountered. Mr. Nevills has been quietly working with a small force of men since September last, and from the very start a stroke of good fortune has attended his operations, never realized by any one man in these parts of recent years. About 2 years ago the mine was bonded to Mr. Nash for a short term, who, after prospecting on a limited scale, without any flattering result, surrendered the property to its owner. The point where Mr. Nash quit was only a few feet from a continuous stream of solid gold, which has been followed in the working of the regular ledge for some 200 ft, and still shows no signs of petering. Last Wednesday we visited the property and were shown over the ground by Mr. Nevills himself, and what we saw fully satisfied us that the reports of the unexampled richness of the ore are not only realized, but eclipsed by the actual facts. The shaft is somewhat over 100 ft deep, and located about 600 ft from the northern limit of the claim. From this shaft two drifts have been run, one south and the other north. It is in the latter that the golden harvest, which has already made the mine famous, has been reaped. This tunnel is now in about 200 ft, and the ledge matter at the face shows 20 ft in width. Whilst the whole of this shaft ledge is of high grade rock, the chert is

free gold are taken from a small seam resting on the foot-wall. This seam varies in thickness, sometimes narrowing to the dimensions of a knife blade, and then widening out to 6 or 7 inches. Where this widening occurs as much as \$2,000 in free gold has been blown out by a single blast. The quartz is frequently held together by spikes of gold. We have shown a couple of pans of ore from this seam. Many of the specimens would assay in the hundreds, and the value of the two pans would reach into the thousands. The rich foot-wall streak is not followed separately, but only worked in connection and as a part of the main ledge. When in the process of blasting the gold vein is displaced, the fragments are sacked and sent to the surface, and in this manner alone the large amount of free gold has been extracted. Several hundreds of tons of rock from the main ledge lies on the dump. Experts estimate that the whole of the pile will yield \$40 per ton. It carries enormous quantities of sulphurets. Samples of ore casually picked from the dump showed free gold in several instances. A fine 30-horse power engine is used for hoisting purposes. The 10-stamp mill is being rapidly put in running order. At the time of our visit carpenters were at work putting in bidders for saving the sulphurets. The rock carries too heavy a percentage of sulphurets for the Frue concentrators to clean up. From the looks of the rock we should judge that 75 to 20 per cent. of the dump pile is sulphurets. The mill is expected to be running inside of a month. From 10 to 12 men are employed at present, but this force will be increased when the mill gets to work. Some idea of the bonanza may be gained when we say that so far, whenever Nevills has needed a \$1,000 or so to pay his hands, he has spread some of the rich ore on a piece of sheet iron, built a fierce fire under it, and the pure metal has flowed out sufficient for all requirements. This splendid strike can hardly fail to give an impetus to prospecting through the entire region between the Moore mine and Middle Bar.

CALAVERAS.

CARSON HILL.—*Mountain Echo*, Feb. 3: We learn that the entire mining property belonging to Gabriel Stevenot, situated on and near Carson Hill, was recently sold to a San Francisco company for the sum of \$150,000. It is also said the company will soon commence work. A clean-up was made last week from 4 tons of ore which was taken from the Invincible, and which yielded about 50 per ton. The shaft is 80 ft deep, and the vein is over 7 ft wide. Messrs. Reed & Co. are rapidly developing a valuable mine.

INYO.
THE DEFIANCE FURNACE.—*Independent*, Feb. 3.
The Defiance furnace, at Darwin, J. S. Gorman, superintendent, closed down on the 27th ult. for a few weeks, during which time Mr. Gorman will pay a visit to the Bay. The furnace has been in blast only at intervals since January a year ago, but has produced a total of 340 tons of bullion, of the assay value of 145 ozs silver and 57 in gold per ton. The lead averaged a value of \$95 per ton. Work will be resumed about the 1st of March. In order to advantageously extract the body of ore in the south workings of the Defiance mine, a new shaft will have to be sunk, else a drift be run 400 ft southward, which remains to be determined.

THE MODOCK.—Supt. Fitzgerald has just refitted the Modock furnace, at Lookout, with a new water jacket of the latest pattern, and in a few days will start up for a long run.

PROSPECTING.—J. H. Stoutenborough, W. A. Bollinger and Bart McGee, of Bishop creek, are prospecting in Deep Spring district.

NEW MILL.—The machinery for Lasky's new mill, at Arastra canyon, Beveridge district, is being packed over the Inyos from Lone Pine.

SNOW'S CANYON.—Eddy, Waterman & Co. will this coming week start up their mill, at Snow's canyon, on a lot of fine ore that will keep it busy about 25 days. Stapp & Morton have out about 40 tons of ore that assays \$200 gold and \$120 in silver.

FOUND SOMETHING.—Gould & Jackson have found a 2-ft ledge of ore in their Gypsy Queen mine, at Darwin. The ore goes 72 ozs silver and 55 gold per ton. They will put up a whim that will enable them to sink at least 200 ft.

AT BISHOP.—Our correspondent, at Bishop creek, says that public interest there now centers on the Sacramento mine. Supt. C. L. Van Epps says the new 5-stamp mill will be in operation by the 20th inst. About 200 tons of ore are already extracted, and a force of men is employed at the mine.

MINING SALE.—A half interest in the Wild Rose mine, in Clover Patch district, near Benton, has changed hands for \$30,000.

MARIPOSA.
BONDED.—*Mariposa Gazette*, Feb. 3 The Eureka, known as the Quartz Mountain mine, and property of the Washington Mining Company, has been bonded to Moses L. Rogers for \$9,000. This is good evidence that the rock of Quartz Mountain mine is good, and will not be abandoned, as was feared by some.

SILVER MINE ENTERPRISE.—It is reported that Mr. Leavenworth, superintendent of the Silver mine, will shortly commence laying 2 miles of 1½ inch iron pipe to bring in water sufficient to run the mill steady.

THE CHRISTMAS GIFT MINE.—This mine, situated 10 miles from Mariposa and 1 mile from Cathay's valley, has a finely developed true 6½ ft vein, averaging from 12 to 18 inches in width. They have a 5-stamp mill.

NEVADA.
THE DERBEI TUNNEL.—*Nevada Transcript*: The new drain tunnel of the Derbec mine is in 2,300 ft, and within 500 ft of the new shaft, which it will reach during the next 80 days. The gravel in the tunnel is looking well, the whole breast being in it. Good pay is being taken from the old shaft. About 65 men are employed by the company.

GOOD ROCK.—*Nevada Herald*: The New Year quartz ledge, situated on Deer creek, above the old Leocompton mine, and about 3 miles from this city, is looking very well at present. A vein of ore 1 ft in width was uncovered a few days ago, and it is estimated that the rock will yield between \$30 and \$40 per ton. The mine is being worked through a tunnel that has been driven some distance into the hill, and the indications are that the body of rich quartz just encountered will prove quite extensive.

PLACER.
HOTELING ITEMS.—*Placer Argus*, Feb. 3: A gang of 12 or 15 carpenters are at work on the new buildings of the California Iron and Steel Company, at Hotelling, to replace those burned on the 10th of September last. The new buildings will have a framework of timbers with the sides and roof of corrugated iron, thus making them less liable to destruction by fire. Six carloads of fire-proof brick lately arrived from Pittsburgh, Pa., to be used in lining the furnace. It is thought with these and other improvements the new concern, when it begins operations—about the middle of April it is hoped—will be able to turn out 30 tons of iron per day. Enough wood had already been cut before the fire occurred to supply the kilns for the coming season.

DECLINED.—The Pearson and Hawken boys, owners of the Morning Star quartz mine, near Ophir, declined an offer of \$40,000 for their mine last week. They ask \$60,000 for it.

MICHIGAN BLUFF AND VICINITY.—We have had a little rain during the past week, but not enough to do the miners any good. The Hidden Treasure mine, which has been shut down for a week or so days past to permit of certain necessary work in the way of repairs and refitting, is now about to start up again with its usual force of 65 or 70 hands. The repairs have been going on for 3 or 4 months past. A new dump has been constructed, some miles of heavy new T rails have been laid, together with various other improvements too numerous to mention. The company is now prepared to go on with work in real earnest.

PLUMAS.
CRESCENT MINE.—*Greenview Bulletin*, Feb. 3: Since our last issue the water in the shaft has been pumped out down to the second level. By the end of the week Mr. Davis thinks this level will be sufficiently drained to allow him to put men to work, when he will start to crosscut for the 4 ledges now exposed at the surface. This shaft was originally put down on what was known as the Pet ledge. It goes perpendicular to a depth of 200 ft; then there is an incline of 75 ft. From the top of this incline the shaft will be sunk perpendicular an additional 300 ft, and crosscuts will be run at convenient distances in the shaft to tap all the other ledges. In this Pet ledge Mr. Davis is quite confident of finding a large amount of rich rock. In fact, he says he knows exactly where there is a large ore body that was in sight when the mine was closed down years ago, and that will yield better than any ore that has been worked since the mine was started up this last time.

ROUND VALLEY WATER COMPANY.—The late rain raised the reservoir a little, but is now about where it was before the storm. However, even though the overflowed area is constantly being lessened, the water is not falling as fast as during the cold weather, showing that the inflow is almost sufficient to supply the demand. It is hoped, at all events, that at least a portion of the Green mountain mills can be kept running. With the present alternating condition of weather, we may, at almost any moment, have storms that will set aside all danger of delay in the running of the mills. Mr. Bidwell, the superintendent, has just completed a "loop" of about 1,000 ft of wire, connecting the ditch-tender's cabin with the telephone system. The superior advantages of this arrangement are at once apparent. As in case of any accident to the ditch or variation in the water supply, communication can at once be had either with Green mountain or Indian valley, or word or assistance sent from town.

TAYLOR-PLUMAS MINE.—The new mill is running splendidly, every part of the machinery working to perfection. During the past 4 days the stamps have been kept at a speed of 72 drops per minute. The flumes, ditches and pipe are in complete order. In a word, the whole mill and attachments are working like a charm. In the mine the winze is going down rapidly, and the ledge grows larger as depth is attained. The ore appears also to improve in quality in the stopes which are just being opened.

SAN BERNARDINO.
BURNING MOSCOW.—*Calico Print*, Feb. 3: Work is progressing on this mine. Eighty tons of ore have just been crushed at Sherman's mill, and 5 or 6 tons are being taken out daily, which are carried down to the wagons on donkeys. This mine is showing up better than ever. The main shaft is down 140 ft, and a tunnel is run roof.

SILVER ODESSA.—The lumber has arrived for the chute to be built at the Silver Odessa mine, and work has been commenced by several carpenters, under the supervision of Pete Kleine.

GRANITE DISTRICT.—Mr. Morrow, from the

Granite district, paid our office a visit the other day. He reported everything flourishing in that district. Work is being performed on some of the mines, which show up well. Some of the shafts are down 40 ft. The El Capitan is one of the finest ledges there, in which Mr. Morrow and W. N. Joiner, of this place, are interested. About the 5th of next month Mr. Joiner is going out there to work on the same. Mr. J. W. Bailey, of San Bernardino, has also struck a fine ledge and feels elated over his good fortune.

GODFREYVILLE.—The boom has at last come to our little burg. The first settlers here did not have to wait as long for it as they expected. The Silver Odessa mining company is building a good road and putting in an ore bin, turn table, etc. They have built a good, comfortable bunk house for their men. The boarding house is now built, and expects to be ready to commence business in a very short time. All the boys in the camp are at work. That is what all mining camps need to insure its success. There is work for all here that will work, and we have no use for bums. Mr. Raymond's mines are now looking fine. All his men are at work on ore. He is sinking a shaft on the Garfield, and in the bottom he has struck a small seam of ore that is almost solid silver. The Evans Bros. are getting some fine ore from Dragon No. 1. That mine is yet destined to be one of the foremost mines in Calico district. The Alhambra is now looking fine. There are two men at work sinking a shaft, and they are getting good ore.

SHASTA.
PLUMBAGO.—*Shasta Courier*, Feb. 3: Several years ago L. Eller discovered a mine, or heavy deposit of plumbago, about a mile from his place, and since then he has prospected it enough to satisfy himself that there is a great quantity of that substance in the location.

SIERRA.
REPAIRS.—*Mountain Messenger*, Feb. 3: Jack Jones, from Little Grizzly, informs us that the company has completed its repairs and will soon be taking out pay again. The prospects are very favorable for continued prosperity. The claim is without doubt one of the best in the county. . . . Mr. Shaw, a large holder of stock in the Marguerite quartz mine at Loganville, has arrived from Boston and taken charge of the business of the mine as superintendent. The mill is running on good rock, and the prospects of the mine were never better.

TUOLUMNE.
PATTERSON.—*Tuolumne Independent*, Feb. 3: The new shaft on the Patterson mine has reached a depth of over 500 ft, and free gold comes up to the surface in every bucket. The company is about to add 10 more stamps, making 30 in all. With good management, Supt. Drake keeps the mill well supplied with 5 men.

RAPAHANNOCK.—Work is being resumed on this mine, which is an extension of the Rawhide mine. The machinery is being repaired preparatory to pumping out the old diggings. . . . Divoll has leased the Keith pocket mine at Jacksonville. The thing is worked with an open cut. . . . Captain Colby has struck another rich pocket at the Big Nugget claim. . . . The Buchanan mine will be opened and worked on a larger scale than heretofore.

Nevada.

WASHOE DISTRICT.
MEXICAN.—*Enterprise*, Feb. 3: On the 2900 level the joint Union Con. east crosscut is making good progress in a formation containing many metal bearing feeders and stringers of quartz. At the joint Ophir winze, down from the 2900 level, guides are being put in for a second line of cages. The guides will all be in and the cages running in about a week, when a crosscut will be started east from the station at the 3100 level.

HALE & NORCROSS.—The north drift on the 2600 level, joint with the Savage, is being advanced at the rate of about 40 ft per week. The drift is still cutting seams and feeders of ore that assay well. Once the drift has been carried through to the Savage line work will be done for the prospecting of the most favorable among the streaks of ore cut across.

SIERRA NEVADA.—The crosscut on the 2700 level is still following the vein of quartz which leads out to the east. The north lateral drift on the 2900 level is making about 20 ft per week, and the east crosscut on that level, joint with the Union Con. Co., is being advanced at about the same rate of speed. Both are in vein material.

UNION CON.—The joint Sierra Nevada east crosscut on the 2900 level is making about 20 ft per week in a promising vein formation. The east crosscut, joint with Mexico, on the 2900 level, is still cutting many feeders of quartz, all of which carry more or less metal. The ground from the 2700 level down is now pretty well dried out.

OPHIR.—The cages will be running in the second compartment in about a week, when a crosscut will be started east from the station at the 3100 level. On the 1600 level are repairing the drain tunnel from the main incline to the Suto tunnel north lateral drift.

SAVAGE.—The north drift on the 2600 level, joint with Hale & Norcross, is making good progress in ground that shows some small feeders of ore. It has yet a considerable distance to go to reach the south line of the Savage ground.

UNION SHAFT.—The pump-roads are all in, and the new pumps will be in place and running by the middle of next week. Some repairs are being made to the drift on the 1600 level, which leads out to the north branch of the Suto tunnel.

NORTH GOULD & CURRY.—The bottom on the shaft is in porphyry containing some seams of quartz and clay. Another shift of 5 men will be put on the first of next week, and sinking will be pushed as rapidly as possible.

GOULD & CURRY.—The west crosscut of the 2500 level is in a reef of hard blasting porphyry. It is likely that a favorable change will be seen when this hard belt has been cut through.

CROWN POINT.—All work on the old upper levels is going on as usual, and the usual amount of low-grade ore is being extracted and shipped to mills on the Carson river.

YELLOW JACKET.—About the usual amount of ore is being extracted and shipped to the mills. The exploring drifts are still finding occasional bunches of paying ore.

BRISTOL DISTRICT.

CLOSED DOWN.—*Pioche Record*, Feb. 3: The mill of the Bristol S. M. Co., which has been running on tailings for a short while, closed down last Saturday, owing to the cold weather. Then, again, there are not many tailings at the mill. A few checks, given by the Bristol S. M. Co. to employees for labor, about a month ago, drawn on Mr. Welles, have been protested in the East. These checks were given to men who refused to file liens on the property of the company. All the men who filed liens received their pay, while those who, to favor the company, refused to file liens, have not been paid, and as the time of limitation has passed, the chances are that they never will be. Men are very foolish to take such risks for their pay, when it is wholly unnecessary.

COLUMBUS DISTRICT.

NORTHERN BELLE.—*True Fissure*, Feb. 3: The main winze from the fifth shaft level is down 124 ft on an incline, which is equivalent to 100 ft perpendicular. A drift has been started from the bottom of this winze, and runs toward where the shaft will be when sunk to that depth. The stope above the first shaft level shows the usual length and width of ore, but it is not so fine in quality, being mixed with streaks of slate, requiring considerable sorting. The other shaft levels present no change. The appearance of the adit and levels above is much the same as last week. The development on the ninth has been opened a length of 30 ft, and shows a vein of very fair grade ore 3½ ft in width. The daily output of ore is about 60 tons, which mill No. 2 continues to handle well, running smoothly meanwhile. A total shipment of bullion amounting to \$66,173.61 was made during the month of January, with one more shipment to be made on that month's account.

MOUNT DIABLO.—The stope above the drift connecting winzes Nos. 1 and 2, shows a foot of \$75 ore. A wide ledge has been encountered in winze No. 2, having 15 inches of ore assaying \$80 per ton, besides several smaller streaks of good grade ore. The intermediate drift below the third level, and west of winze No. 1, is giving some \$60 ore from bunches in a wide ledge, from which the assays average \$45 per ton. The stope above winze No. 4 shows some 20 inches of \$75 ore. Several carloads of \$60 ore are being extracted daily from the stope above the west drift from the Callison winze. Considerable ore of the value of \$70 per ton is being taken from the intermediate, below the first level, at various points. The stope from the west drift, from the south crosscut in the eastern part of the first level, shows 15 inches of \$90 ore. The Tipton ledge still continues to yield a small amount of \$70 ore.

COMET DISTRICT.

BEGINNING TO BOOM.—*Pioche Record*, Feb. 3: Comet district is beginning to boom. All the prospectors from Bristol district are there. There are now several very excellent prospects uncovered. A large number of people have visited the district during the week, and all are unanimous in pronouncing it an exceedingly big showing for on the surface. The owners of the claims have just commenced to work them, and, of course, have great expectations, which we hope will be realized.

EUREKA DISTRICT.

HAMBURG.—*Eureka Sentinel*, Feb. 1: From J. C. Powell, superintendent, we learn that the strike reported in the Hamburg mine is a body of rich ore about 18 inches wide and some 4 ft, running crosswise of the face of the drift about 45 degrees. At both ends it seems to spread, making down and up. The extent of the deposit cannot be determined for several days yet, as a large body of low-grade ore has to be cleared away before the work of development can be pushed. Mr. Powell thinks it will prove similar to other small chambers of high-grade ore that have been found in the mine. There are about 200 tons of low-grade ore knocked down. In about a month the engine will be put up, and this ore, with what more may be dug out in the meanwhile, will be hoisted out and shipped for reduction. Mr. Powell tells us that a very nice find has been made in the Silver Lick also. In the face of a 60-ft drift, run from the bottom of the 60-ft shaft, the entire face of the drift is in ore that will go from \$60 to \$80 per ton.

JACKRABBIT DISTRICT.

WORKING.—*Pioche Record*, Feb. 3: Many of the claim-owners of Jackrabbit district are industriously working their claims, and many of the prospects exhibit good ore. Most of the work being done in the Day mine at the present time is done by contract.

REBEL CREEK DISTRICT.

MILLING AND MINING NOTES.—*Cor. Silver State*, Feb. 3: In consequence of the severe cold weather experienced here during the past two or three weeks, the new mill of Messrs. Harlan & McColley has not attempted to make a run. The roads from the mines to the mill are mostly as nature made them, and nature having furnished them with a liberal coating of ice and snow, the hauling of quartz is a matter attended with much difficulty. The danger of bursting water pipes, and the liability of ditches giving way during extreme cold weather, are doubtless some of the reasons why the commencement of hostilities has been so long delayed. Everything is now ready, and all hands hope for an early start and successful run. For what it is worth, I give you my opinion of this, Rebel Creek district. There are running through this district, four separate and distinct mineral belts, or formations. The first and lowest on the foothills is silver-bearing, with copper predominating as the base metal. The second bears both gold and silver, with iron predominating as the base metal. The next is silver, with lead for the base, and last, but not least, a free gold formation. I am not sufficiently versed, either practically or theoretically, to know whether this arrangement will stand a scientific test. This is a large district, and but slightly prospected. With some experience in mining camps—tough experience, by the way—I do not hesitate to say that I know of no locality so desirable or promising for the prospector or capitalist as this, and no time so good as the near future.

TAYLOR DISTRICT.

MILL.—*Pioche Record*, Feb. 3: Dick Milliek reports that the Taylor mill, in Taylor district, is to have an addition of 15 more stamps, and be started up as soon as the cold weather abates.

SPRING VALLEY DISTRICT.

EAGLE MILL.—*Silver State*, Feb. 3: The Eagle mill, in Spring Valley, south of Unionville, is now running steadily on ore from the Eagle mine. The property is owned by the Vandewater company, and is managed by Major E. D. Luxton. A fine body of rich, gold-bearing quartz has been opened in the mine at a depth of 160 ft from the surface, and it is said to be paying handsomely. Below the mine some 60 Chinamen are at work placer mining. These placers have been worked for several years, and have produced over a million dollars worth of gold dust. It is generally believed by miners that there are several rich gold leads in the mountains above the placer mines, as very rich float quartz has been found on the surface, and that sooner or later those leads, of which the Eagle is one, will be worked extensively.

WARD DISTRICT.

BULLION.—*Pioche Record*, Feb. 3: Nine bars of bullion was shipped from Ward last Thursday morning. The mine of the Martin White company is of greater value than the public have any idea. Gilmer & Salisbury intend putting on four-horse coaches from Ward to Eureka.

Arizona.

MINERAL HILL.—*Pinal Drill*, Feb. 3: Mr. Thorning has returned from the Bruiser, situated in Box Canyon, in the range of mountains generally called Mineral Hill district. A very large body of argentiferous galena appears disclosed by the last work, giving assurance of an immense ore-body and a very valuable mine.

LOWER TURKEY CREEK.—*Cor. Prescott Courier*: The mining outlook was never brighter than it is at present in this section. Smelting furnaces and sawmills are going up in the different parts of the district. The mines are looking well and turning out plenty of ore. The following is a description of some of the mines:

MOUNTAIN VIEW.—This fine property is situated a mile and a half below the old Bully Bueno mill, on the east side of Turkey creek. In this claim are two strong veins, some 50 ft apart, the average width of each vein is over 4 ft. The ore is a fine galena, assaying from \$50 to \$125 per ton, silver. The ledges run north and south. On the east vein the shaft is down 50 ft, and drifts are being run from the bottom. The company will sink their shafts 300 ft, drifting every 50 ft. The shaft on the west vein is down over 50 ft, showing a fine body of ore. Assays from the croppings of this vein averaged \$250 per ton, silver. There are at present over 200 tons of good ore on the dump of this mine. This company own also, the Red Cloud and Howland mines, south extensions of this mountain vein.

Colorado.

LA PLATA DISTRICT.—*Cor. Rocky Mountain Mining Review*, Feb. 3: The first mining claim staked in Clear Creek camp was in the fall of 1880. The writer was one of the number who packed his burro and started, and we found what we then thought would turn out big, and have not been disappointed. The progress of the camp from that time to the present has been slow and steady, but sure. Hundreds were in last summer, and many rich finds were made. The Fortune mine, one of the first discoveries, was bonded a few days since for \$75,000. Two shifts of men are now at work taking out ore valued at from \$200 to \$600 per ton. This property is situated quite near the town of Winfield. Wm. Wallace, discoverer of the Hesperus mine, last September, has been steadily shipping ore from the surface, receiving for each carload \$3,000 net. The Swiss Boy is a valuable mine, steadily shipping ore of a high grade. The Mammoth mine is among the biggest. It has been in litigation for some time, but now the matter is settled. Messrs. Cunningham & Co. have possession, and are erecting concentrating works with a 65-horse power boiler. This mine has an immense body of ore, the vein being 4 ft wide.

New Mexico.

TELEGRAPH.—*New Southwest*, Feb. 1: The developments in the Telegraph district show richer and larger ore bodies as greater depth is attained.

SMEILER.—John R. Magruder has made arrangements to erect a 30-ton smelter in the Hanover gulch. It will be built entirely for the purpose of doing custom work.

IN SIGHT.—The St. Louis and other mines of the Valverde Co. shows a great many thousands tons of ore in sight ready for stopping. These mines alone can furnish forty tons of freight per day to the Silver City and Clifton railroad.

Oregon.

NOTES.—*Jacksonville Times*, Feb. 3: Miners favored with good water rights are at work. Miners in Josephine county have a good supply of water and are busy. More rain has fallen there than here. Miners in the northern portion of Jackson and Josephine counties have plenty of water and are using it to good advantage. The party working Bybee & Saunders' claim on Rogue river, Josephine county, have struck good prospects and are doing first-rate. Both of the quartz mills at Horsehead and Blackwell are now in the best running order and good reports may be expected from them. Considerable ore is being taken out. J. E. Gale and E. E. Moore, who are mining at Hole-in-the-Ground, Leland precinct, are getting good prospects. They picked up a piece of gold worth \$8, the other day. The Sterling mine has not been able to do much this season, owing to the cold weather. Mulkey & Co., who are mining A. P. Talent's land on Wagner creek, have an abundance of water and are doing well. They washed a rod of dirt not long since and obtained over \$100. We were shown some excellent prospects from that claim this week. Judge Hanna has directed the superintendent of the Wimer & Simmons mine near Waldo to work only the undisputed ground. Mr. Hansen has given the required bonds and operations are progressing with dispatch since the cold spell was broken. There has been some rain during the past week, but not enough to give most of the miners a sufficient head of water. Still, there is every prospect of a good run yet, as the cold snap seems to be over and but little more rain is necessary to start a plentiful supply of water.

LIVER diseases, headache and consumption, caused by bad digestion, quickly cured by Brown's Iron Bitters.

Eastern Utah.

The Mining Camps Amid the Peaks of Uintah.

A correspondent of the Salt Lake Tribune, writing from Brown's Park, says: Brown's Park and vicinity contain much that is of interest in the line of minerals and physical features. We shall be disposed to refer to it again. From Brown's Park postoffice the traveler crosses the river and wends his way over a plat of some two miles in extent, where he enters a thick growth of cedars, and the ascent of the main range of the Uintah's begins in earnest. Up a rough rocky hill for a mile through the thick cedars the road bends to the left and goes down into Trail creek canyon, up which the road runs. This is a very rough, bad road.

Somewhere about two years ago the Green river folks got an unusual streak of enterprise, and raised about \$2,200 to work the road from Green river to Thornburg, but some contention arose as to the manner of disbursing the funds when the work was in progress, and operations ceased, the result being that the road is spasmodically good for a short distance, and shows off to advantage the naturally bad places. This particularly bad portion is, however, only about seven miles long. When the ascent is made, a very pleasing country greets the traveler.

It is composed of high and rough peaks, with smooth and comparatively level valleys, the mountainous portion being covered with cedars, and the valleys with a heavy growth of rich grass, and an occasional spring or brook. As may be supposed, this is an excellent summer range for stock.

Through passes and valleys we take our way to the west by south to our destination. For about 15 miles we pass through a formation of old red sandstone, and wonder at the immense mountain. We may add that this is the general characteristic of the northern slope of these mountains, which extend for a distance of over 100 miles in length. Near the watershed of these mountains the formation suddenly changes to that of the carboniferous age, the contact between the two periods being strongly marked and the change abrupt. Now we see quartzite and the old blue limestone, and enter on one of the largest formations of this sort on the North American continent. The writer has traced this formation from near Salt Lake City to a point in Colorado, distant near 300 miles, the same general characteristics being prominent the whole distance.

In this formation where the mountains reach an altitude of 10,000 feet and the thickness of the strata is many hundreds, is situated

The Carbonate Mining District.

The most prominent of the mines here now and around which there is much interest is the Copper King, which is a large mine, bearing copper ore of unusual richness and fineness. This mine exhibits a peculiar feature, in that there is no low grade ores produced, and that all ore taken out is of an even richness and does not vary enough to allow of being assorted. It runs from 60 to 70% copper. This mine was discovered by Sam Montgomery three years ago, but the vein was not really found until a few weeks back. Ben Heater, Bob Turner, James Harz and others have been to work in an obscure way, but with a quiet determination which should be rewarded. In this case the reward has come, and the boys feel that they have ample pay for the hardships and hard knocks they have had. Some evidences of the amount of labor expended on it can be seen in the many prospect holes near by, every one of which is fifty feet in depth and shows nothing but mineral. The lead proper just unearthed shows now about four feet of the richest kind of ore; how much wider, is not yet known, but at present only one wall has been found. The lead works easy, the copper ore coming out in big chunks, which is intermixed with beautiful yellow sand carbonates. The mine is situated near the top of one of the high mountains, and is between a contact of beautiful white quartzite and blue lime. A short distance below is a fine strata of hematite of iron, and still lower in the contact of the old red sandstone, showing very clearly that this bed at least lies near the bottom of this gigantic formation of lime. Immediately above the mine towers a high cliff of limestone, quartzite, flints and various other strata incidental to this period. From the dip of the lead to the southwest and the huge masses above, we naturally infer that the other mines which lay southwest of here will be deep.

There is now about a carload of rich ore on the dump awaiting spring for shipment. Besides the copper ore, the ore runs about 20 ounces silver, and I believe a trace of gold, with a strong marked improvement in the silver assays as depth is attained.

The Amazon exhibits some strong croppings of copper and galena ores, and it is down about 15 ft.

The majority of the claims taken up here some three years ago, during an influx of Colorado prospectors, are now open to relocation, and I have no doubt but that if some of them were properly prospected they would prove of value.

The Union Consolidated Mining Co. are interested in some claims here, but what the company design doing I do not know.

This camp presents many desirable features of great value, the most noticeable of which is

the supply of good timber, which is far better than the average of our Utah timber. Parsons & Oakley have a fine saw-mill located in the center of the camp, and have cut some good lumber.

Botanizing in the Land of the Apaches.

In August, 1881, after the rains had partially subsided on the desert of Arizona, Prof. Lemmon and his wife started on their third summer's exploration in Arizona. From observations from the train of the Chiricahua mountains the season before, they supposed that that would be a good range of mountains to visit.

After several detentions on the desert, they arrived at Bowie station in the night. Bowie station is a military post on the railroad, and is composed of but a few houses. Here they expected to find a friend, and, when the train left, began calling for him. For some time there was no response, but finally a light appeared in a tent north of the station and a man emerged and asked, "What's wanting?" Out came another man, girl about with a belt containing pistols and cartridges, with knives in his boots, and then another, until finally there were five of them. Prof. Lemmon told them that they desired shelter for the night, and Capt. Tevis, a noted character of the region, vacated his own quarters and gave them up to the botanists. He locked them in and left them a brace of pistols, saying, "You may have to use them before morning."

An adjoining cabin was filled with cowboys. The storm which had been brewing now broke with terrible violence, and the water came down in torrents. During the lull after a clap of thunder, a voice was heard to say, "Let them mules alone. Git!" And in the morning they were told that the cowboys had endeavored to carry off the mules, but were discovered and stopped. In the morning the sun came out bright and beautiful, and they went out botanizing, up to their knees in beautiful flora. About noon the next day an ambulance came, as per agreement, from Fort Bowie, with Surgeon Ord and wife, whose guests Prof. and Mrs. Lemmon were to be.

They crossed a plain and then up through a wonderful pass, called the Apache Pass, which contained the only spring for many miles. Here the Apaches would lie in wait for the thirsty travelers and shoot them down. In this pass is a graveyard filled with little headstones, which read, "Killed by the Apaches, name unknown." The work of the Apaches may be understood from the statement that they reduced the population of Arizona from 60,000 to 10,000. This pass was now filled with beautiful flora and was a most enchanting place. They first began picking flowers and putting them in a press, then filled every available spot in the ambulance until, five miles before they reached their destination, there was room for no more.

They remained at the fort some three or four weeks, though they had expected to go south sooner, but were detained at the fort on account of the breaking out of the White Mountain Apaches. Their real objective point was to make a short stay at Fort Bowie and then to go on to the deserted Camp Rucker, in the southern part and highest point of the Chiricahua mountains. At length, having been assured that the Chiricahua Apaches were friendly and that they would be perfectly safe, they started out in an ambulance with a guard to protect them from the cowboys, and provisions for three weeks. They started on the 21st of September, the day of Garfield's death, which they did not hear of for 10 days. They met with numerous adventures, and arrived at 10 o'clock at night at a ranch house, where they stayed all night. They took an early start the next day for Rucker valley. The scenery became wonderful; they appeared to be entering an amphitheater of rocks. The rocks had assumed all forms; monks going to confession with the cowls over their heads, and in supplicating attitudes, and through all the most beautiful flora.

Prof. Lemmon bore letters of introduction to a curious old hermit, the only occupant of the whole valley, calling himself Dr. Monroe. That was their objective point. As they approached his cabin the noise of their feet stirred his lens to cackling; then the upper part of his door opened, and the old hermit appeared—a little old man with a hooked nose like an eagle's, a dilapidated straw hat over his right ear, long, fine hair, streaked with gray, and piercing black eyes. His clothing was half military and half frontiersman. He read the letter, and then opened the lower part of the door and invited his guests in. The guard of soldiers returned to Fort Bowie, but were to come for the excursionists at the end of ten days.

The hermit entertained his guests with stories of his life and his instruments of defense, which consisted of a certain tunnel, so ingeniously constructed that it is worthy of description.

At the back of the cabin some sacks were carelessly hung, which, when drawn aside, disclosed what appeared to be a cellar, but which really was the opening of a tunnel 120 ft. long, with a double elbow in the middle and a cabin at each end. The tunnel was just high enough for himself, and he was a short man, only about five and a half feet high. The bottom and roof were rough with cobble stones. The middle was enlarged to allow for storing and defense. It was very

dark, and unless one was acquainted with it, it was of no use to try and follow the hermit. For defense, in case he was overpowered, he had an arrangement of fuse, carefully covered over with rock and cobbles, which when fired would blow up everything.

This Dr. Monroe was a very intelligent man, and had evidently moved in high circles. He had had some 23 different occupations in life, from playing the clarinet in a circus to teaching school in Virginia and practicing medicine. Hanging over the fireplace was not less than 12 hats, in different stages of dilapidation, and he was never seen without one of these on. He never put it square on his head, but always on one side. He kept cats and chickens, and when asked why he did not have a dog, he said that several years ago he had a partner in a mining scheme, and they had a dog which was considered very faithful. One day the partner returned to the cabin to get dinner, and when Dr. Monroe reached it an hour later he found his friend dead. The dog had not given the alarm of the approach of the Indians, but had skulked off and hid. After that he never had any faith in dogs.

Time passed. One morning Prof. Lemmon was out botanizing, and Mrs. Lemmon was alone at the cabin, when a rider came up and said he had ridden all night to warn them that the Chiricahua Apaches had broken out and were starting for their old stronghold, the very valley where the Professor and his wife were peacefully botanizing. He brought a letter from Dr. Ord and wife stating that they were powerless to help them, and advising them to secrete themselves in the mountains and they would come to their relief as soon as possible. It was a time of great anxiety, and they were hammed in for 11 days before an officer came saying that Capt. Rafferty was but four miles away and would escort them back to Fort Bowie.

They reached Fort Bowie in safety with a great many plants. A new genus of fern was named after Mrs. Lemmon. They discovered many other new things, and altogether it was a very successful trip.

Deposits and Lodes in the Mining Laws.

Ever since the discovery of the "blanket lodes," or deposits at Leadville, Col., the fact has been recognized that the United States Mining Statutes are at fault in not properly providing for the location of this class of mineral ground. The law supposes a man will find the apex of the lode sticking out of the ground somewhere, but in this (as in many other things) the law is mistaken. The law does not give any definite ownership of mining ground until the mineral-bearing lode or deposit itself is found. When, therefore, miners search for "blind lodes," or horizontally lying and deep deposits, they have no rights at all till they strike the deposit or lode. The reading of the law is such, as miners know, as to provide more for lodes than deposits. In order to overcome these objections the miners of Colorado have memorialized Congress in the following terms:

WHEREAS, The geological formation and other evidences indicate the existence of valuable deposits of carbonate and other ores in many localities within this State; and

WHEREAS, Owing to the horizontal position of such deposits, they are seldom or never discovered except by boring or sinking deep and expensive shafts; and

WHEREAS, The laws of the United States on the subject of mining are not construed to give any right of possession to the surface of any definite area of mineral lands of the public domain until after the discovery of mineral in rock in place on such lands; and

WHEREAS, The right of possession and occupation of some definite area of such lands is necessary to encourage the expenditure of labor and money to sink for the discovery of mineral; your memorialists respectfully request the enactment of a law granting the right of location, possession and occupation of claims on such supposed mineral lands, such claims to be 10x10 or 5x20 chains, and contain 10 acres each, and conform to the public land surveys, when located on public lands, and that the right of possession of such locations continue so long as the locators expend \$100 in labor or improvements each year on such locations, and for the purpose of enabling such locations to determine the true character of such supposed mineral lands with the least possible delay or expense; that locators be allowed to consolidate any adjoining locations not exceeding 10 in number, and expend all labor and improvements in one or more places on such consolidated locations, and that the right of occupation and possession to each claim so located and consolidated continue so long as the amount of money expended or improvements made on such consolidated claim shall equal \$100 each year for each claim so located and consolidated, and that locators of such claims be entitled to all mineral discovered in claims between vertical planes drawn downward through the surface boundaries of such claims to any depth, and that such claims, when located on surveyed lands, may be described as subdivisions of the public lands, and that patents for such locations may be obtained under such regulations as Congress may determine.

Right of Way of Mining Ditches.

An artificial water course through the land of others is strictly an easement, and the right to construct it is the subject of contract or agreement. At common law the right may be acquired by an uninterrupted adverse user of 20 years. It is not understood that the few cases in which the rule of prescription has been applied in this State to water from a natural stream has any application, or at common law, to artificial streams. In addition to the special legislation applicable to certain agricultural counties, for the purpose of irrigation, and expressly excepting the Acts from affecting the mining interests of this State, passed in 1854, and amended in 1862, and corresponding with the Mexican *Ordenanzas de Tierras y Aguas*, there has been some legislation authorizing the incorporation of canal companies for irrigation, mining or manufacturing purposes. Acts by the State and by the United States leave nothing unprovided for, so far as respects the public lands. When, however, private lands are to be crossed on the route of a canal or ditch, proceedings must be taken to obtain the right of way.

A case of interest to miners in this connection has been decided by the Supreme Court of the State. The case was that of Henry Lorentz et al. vs. Henry Jacob, the decision being rendered by Judge Morrison, and concurred in by Judges Myrick, McKinstry, Ross and Thornton. Plaintiffs commenced proceedings in this case under Sec. 1,238 of the Code of Civil Procedure to condemn certain lands belonging to the defendant for the purpose of a ditch then under process of construction by them. It is alleged in the complaint that the plaintiffs are now constructing and completing a ditch for the purpose of carrying water from a certain point on Connor creek to plaintiffs' reservoir on Red hill, in Trinity county, and that the uses for which the water is intended and designed are mining and irrigation. The Court below entered a judgment in conformity to the prayer of the complaint, and defendant appealed.

The decision is as follows:

There are two points made by the defendant's counsel which we will briefly consider: First, the findings are insufficient to support the judgment, and second, the evidence shows that the use for which the property is sought to be taken is a private use.

The following are some of the findings:

"3. That one of the uses for which the proposed ditch is intended is the sale and rental of water for mining and agricultural purposes.

"9. That the use to which plaintiffs intend to devote the proposed ditch is for the sale, rental and distribution of water to the mining claims and agricultural land in said Red Hill mining district, including mining and agricultural land belonging to said plaintiffs, and is not a purely private use."

At the request of counsel for defendant the following additional finding was filed by the Court:

"5. With the exception of plaintiffs' own mine, the owners of the different mining claims and agricultural lands mentioned could be served with water by means of ditches already in existence, and have been so served with water in former years. The ditches so used have ample capacity to carry the waters of Connor's creek, except in times of exceptionally high water. Some of these ditches have fallen into disuse, or have been worked away, and with the exception of the Connor ditch, the Jacob's ditch, the Mackey ditch and the Butcher ditch, none of these ditches have rights of water of any value, either for mining or irrigating purposes. To serve the various claims and agricultural lands with water through these old ditches by letting the water run down Connor's creek would involve a great waste of water, unless purchasers would take it at all times, night and day."

The conclusion of the Court below was: "In conclusion, after a careful examination of the evidence offered, the following appears to be the true state of the case: Plaintiffs are the owners of the most valuable interest of any in the waters of Connor's creek, which stream is the only one available for working the mines in the Red Hill mining district. This water they have used for many years past in working their own mines, occasionally renting some to others for mining or irrigating. Plaintiffs cannot work their mine to advantage by means of ditches now in existence, and rather than have their water become worthless, they propose to make a public use of it, in which use, as a part of the general public, they will be entitled to a share. The question is not free from difficulties, but in my judgment the statute should be liberally construed in a mining country; and if it appear that the intended use is a public one to a reasonable extent, the right of way should be granted."

We think that both points are well taken.

The findings are insufficient to show that the use for which the water was intended was a public use, and it clearly appears from the evidence that the main and substantial object of plaintiffs is to use the water in working their own mining claims. Private property cannot be taken for such a purpose. (The Wilmington Canal and Reservoir Co. vs. Dominguez, 50 Cal., 505; Cummings vs. Peters, 56 Cal., 593; Bankhead vs. Brown, 30 Iowa, 540.)

Judgment and order reversed, and the Court below is instructed to enter judgment in favor of defendant.

The Horn Silver mining company, of Utah, will pay a quarterly dividend of \$300,000 at New York on the 15th of February. This company paid four dividends of that amount last year. The pending dividend makes a total of \$2,000,000 given to stockholders.

Dust Explosions in Mines.

The subject of dust explosions in collieries and flour mills appears to have received a considerable amount of attention in the U. S., and Prof. Abel, F. R. S., lately delivered a lecture at the Royal Institution on the dangerous properties of dust. Few persons are aware how frequent such explosions are; they have been briefly alluded to, and it is stated that those who are conversant with this subject are of opinion that not more than 20 per cent. of the explosions that occur are made public because, unless the damage is serious, mill owners and others are unwilling to direct attention to the risks of their business. A very interesting quotation is given from a special report on the subject prepared for the Board of Trade. All the dust floating about a flour mill, common flour, "stive" dust from millstones and purifiers, the dust from the beams of the mill, from wheat cleaning machines, and especially, it is said, the "stive" dust from millstones grinding rice, all such dust is, under certain conditions, found to be very explosive. The quotation alluded to gives a very clear and intelligible explanation of the phenomenon which has lately been believed to be responsible for many mining accidents. It is merely a manner of rapid combustion; the finely divided dust particles being diffused in the air, are each brought into intimate contact with the oxygen, which is necessary for their combustion, and consequently when ignition occurs it is very rapid; the particles near the flame are ignited, and in their turn ignite the neighboring particles, which again ignite the adjacent ones, until the whole chamber is a body of flames. Touching this matter, an invention for the prevention of dust explosions in collieries and for other similar purposes, and for allaying such dust, has just been brought under our notice. We understand that it has been favorably reported upon by some of the leading colliery and other engineers, that it can with advantage be adopted for the prevention of explosions from coal dust. The invention is that of Mr. Stanley, and it is being introduced by Mr. William Thompson, of No. 12 York Buildings, Adelphi. For railways and mines, Mr. Stanley proposes fixing on a carriage a shallow tank, and above it, on supports sufficiently low to freely allow of its passing through the tunnel, another similar tank for water. Between the two tanks, at a distance of a few inches apart, perforated metallic tubes or wire gauze may be placed, which will conduct the water from the upper to the lower tank, which in thus gravitating through the perforated pipes, or down the gauze, will prevent the impure air a thin film of running water. The perforated tubes or gauze may be covered with flannel or other fabric, which will have the effect of retaining the water and prevent its flying off by the rapid motion of the carriage through the air. To keep a constant supply of water in the upper tank, Mr. Stanley uses a pump of sufficient capacity to keep the upper tank supplied with water from the lower one. For this purpose he utilizes the motion of the carriage, and works the pump from a drum fixed to the axle. Other motive power may be used such as compressed air, gas or steam. For collecting as much air as possible in passing, wings or louvers are, where practicable, to be hung to the carriage.

Considering that colliery owners run great risk of explosions from atmospheric and other causes, it is to their interest, independently of their responsibility as the guardians of the lives of their workmen, to adopt most stringent regulations and efficient precautionary measures for abolishing this source of danger, and to devote their energies to the application of improved arrangements for reducing the danger arising from the presence of dust, which not unfrequently results in the loss of valuable lives, besides entailing great pecuniary losses. In addition to all this they are responsible, under the Employers' Liability Act, for compensation both to widows and children of those who have been killed. We are informed that a joint report upon this invention has been made by Mr. Galloway, of Cardiff, and Mr. Howard, of Chesterfield, to the effect that it could be advantageously introduced at certain points in the workings in order to create damp localities, which would arrest the flame of coal-dust explosions, and that in mines, or parts of mines in which black damp, or carbonic acid gas, is given off by the strata or produced in any other manner, this apparatus, either locomotive or stationary, could be used with advantage for the purpose of absorbing that gas by means of caustic lime placed in the upper tank. The water would absorb a certain proportion of the lime, and in flowing down the tubes or rods it would take up the gas; the lime would thereby be precipitated, and would, for the most part, collect in the lower tank, from which it could be removed as required. The apparatus would be more especially applicable in localities where sprinkling water on the floor causes the latter to "heave" in such a manner as to disarrange the underground tramways, and gradually to fill up the roadways and railways, thereby occasioning much trouble and expense for repairs. On the whole, the invention appears to be one of promise, and we shall hope shortly to hear of its practical adoption.

GLASS VARNISH may be made of pulverized gum dragant, dissolved in the white of eggs well beaten. Apply with a brush carefully.

USEFUL INFORMATION.

Vanderbilt on Fast Locomotives.

A provincial paper prints a story that Mr. William H. Vanderbilt, the President of the New York Central and Hudson River railroad, has ordered his master mechanics to devise large and fast locomotives, capable of hauling 15 heavy drawing-room cars at the rate of 60 miles an hour. In it the statement is made that he offers a prize of \$50,000 for the best plan for an engine that will accomplish this work.

When asked by a *Times* reporter if the statement were correct, Mr. Vanderbilt replied: "There is no truth in that story. Why," said he, "engines leave the Grand Central depot every day that haul 13 cars and run at the rate of 60 miles an hour. We are not going to pound the road to pieces by putting on larger engines. If one engine will not haul a train we will put on two, and if necessary, add more trains; that is all. If a train is run by schedule 40 miles an hour, the rate is 60. Suppose a stop of 20 minutes is made for refreshments, and the train is late. The conductor will wait the full time at the station, and let the engineer make it up. I do believe," said Mr. Vanderbilt, smiling at his supposition, "that if an engine could run 140 miles an hour, and could cover a certain distance at the rate of 30 miles, the conductor would hold the train in order to run at the full 140. If an admonishment is administered, the operation is repeated as soon as your back is turned. No, we have engines that are fast enough."

MOLECULAR STRUCTURE OF METALS.—It is generally held that although most of the known metals are crystalline, they cease to be so when in a rolled state. Whether this be strictly true or not has never been put to the test, but recent experiments by M. S. Kallischer prove that foils of the metals can be made crystalline under the influence of heat. One result of the change is an increase of their electric conductivity. Non-crystalline zinc foil becomes crystalline at a temperature of 150° Cent. Tin and cadmium foils become crystalline at temperatures ranging from 200° to 280° Cent. Iron and copper show traces of crystalline structure when left in contact with nitric or hydrochloric acid; but the best result is obtained when the plates are made the positive electrode for the electrolysis of potassium or copper sulphate or nitrate. Specimens of brass containing 36 to 66 per cent. of copper showed a crystalline structure when made the positive electrode of solutions of copper sulphate or nitrate. In these cases the electric current does not, in M. Kallischer's opinion, produce the crystalline state, but rather the solvent power of the electro-negative constituent of the electrolyte, for it is observed that metals which do not show any crystalline appearance when corroded by free acids or solutions of salts, do not show it under the influence of the electro-current. Lead foil is crystalline; silver foil becomes so when heated red hot; gold foil exhibits a crystalline structure when heated and then acted upon with warm aqua regia. Platinum, as was observed by Phipson, becomes crystalline when warmed with aqua regia. Bars of copper, brass, steel, bronze, tin, zinc and cadmium have been carefully observed by Kallischer, and shown to have a crystalline structure.

PAYMENT FROM FIRST EARNINGS OF A MACHINE.—An engineer was employed to operate the engines of a company, and it was agreed that he was to be paid out of the first earnings of the machines. He had a settlement with his employers and they gave him a due bill for the amount due, and on this he brought suit, to which the defense was set up that payment only was demandable out of the earnings aforesaid, and that there as yet nothing had been earned. Judgment was entered for the plaintiff, and the defendants appealed the case (Harkinson vs. the Dry Placer Amalgamating Company) to the Supreme Court of Colorado, by whom the judgment was affirmed. Judge Stone, in the opinion, said: "The question is one of practical interest not infrequently arising in business ventures, and we have been at some pains in its investigation. The agreement did not expressly limit the payment wholly to the contingency of the machines earning enough to pay for the services rendered; and in the absence of an express limitation, it is not to be implied that the engineer agreed to look to the earnings alone for his wages. This condition can only be regarded as indicating an expected time of payment, but not as the sole condition of payment; and as a legal consequence of such an agreement, the wages would be absolutely due after a reasonable time for fairly testing the use of the machines. What is a reasonable time in all such cases is a question for the Court."

The thread industry of the United States, while it does not rank alongside the iron and steel industries in importance, makes quite a respectable showing, in figures at least. American manufacturers now turn out daily 12,000 dozen spools, containing 200 yards each; or, in other words, enough thread in six days to girdle the globe four and one-sixth times. The annual consumption of spools by our thread makers alone represents from 3,000 to 4,000 cords of wood. Foreign thread manufacturers who export largely to this country also use immense numbers of American spools, winding their thread upon them after the thread has paid duty at some of our ports. The consumption of the best grades of thread in our country is estimated at 21,000,000 spools per annum.

NEW METHOD OF SILVERING MIRRORS.—If glycerol is added to an ammoniacal solution of silver nitrate, it becomes brown after a time, and gradually deposits a black substance; this action is greatly accelerated by heating the solution, a portion of the silver being deposited as a steel-gray mirror. If a few drops of potash solution are added to the mixture of glycerol and ammoniacal silver, a brilliant mirror is soon formed on the interior of the vessel. The phenomenon is even more striking if the ammoniacal silver solution be first mixed with potash, and glycerol then added; directly the glycerol comes in contact with the silver solution, reduction takes place with formation of a brilliant metallic mirror. If either is added to the mixture of glycerol, potash, and ammoniacal silver nitrate, as soon as it touches the aqueous liquid, a metallic ring is formed at the junction of the two liquids, and in a few seconds reduction is complete through the whole bulk of liquid. If alcohol is added to the glycerol-silver mixture, reduction is somewhat accelerated, and the metallic mirror is always brilliant. The results of these experiments show that the reduction action of glycerol on silver salts may be applied technically with advantage to silvering mirrors, both from the facility with which the process may be conducted, and from its economy. The author, G. Palermo, promises details in a future communication to the *Gazetta*, from which the above notice is taken.

GLYCERINE FOR PRESERVING SKINS.—A mixture of glycerine and carbolic acid is highly spoken of for the purpose of preserving the skins of animals. Salting keeps the skins damp and prevents their putrefaction, but is objectionable, since it renders the leather less useful for various uses after tanning. Glycerine alone is not entirely satisfactory, but a mixture of glycerine and carbolic acid removes all disadvantages. The carbolic acid increases the preserving effect of the glycerine, while the glycerine keeps the skins perfectly soft and fresh, just as they were directly after slaughtering. Both substances are entirely without any injurious action on the substance of the skins, which are freed from them by simply washing, and are then in exactly the same condition for working as ordinary green skins. The method of using the preservative mixture is described as follows: The fresh skins are covered on the inner side with a mixture of 90 parts of crude dark glycerine and 10 parts of carbolic acid, by means of a plasterer's brush, and afterwards treated and packed as usual. Whether the advantages of this method have more than offset its increased cost above the common method, we are unable to state.

GOOD HEALTH.

Artificial Child Incubation.

The report of some remarkable experiments in so-called artificial child incubation comes from France. The *Glasgow Mail* says that the immense success which has attended the artificial incubation of chickens in France recently attracted the attention of Dr. Tavernier, a learned and ingenious physician. He was attached to a hospital for foundlings, and was annoyed at the large number of foundlings who died within the first six months of their life. The majority of those admitted to the hospital were weak and sickly, and he resolved to try what "artificial incubation" would accomplish if applied to infants. The doctor constructed a child incubator on precisely the model of the ordinary chicken incubator. It was a box covered with a glass slide, furnished with a soft woolen bed, and kept at the temperature of 86° Fah., by the aid of hot water.

He selected as the subject of his first experiment a miserably made infant, one that had come into the world at an injudiciously early period. This infant was placed in the incubator, provided with a nursing bottle, and kept in a dark room. To the surprise of the doctor, it ceased to cry on the second day after it was placed in the incubator, and although it had previously been a preternaturally sleepless child, it sank into a deep and quiet sleep. The child remained in the incubator for about eight weeks, during which time it never once cried, and never remained awake except when taking nourishment. It grew rapidly, and when, at the expiration of 60 days, it was removed from the incubator, it presented the appearance of a healthy infant of at least a year old.

Delighted with the success of the experiment, Dr. Tavernier next selected an ordinary six-months-old infant addicted to the usual pains and colic, and exhibiting the usual fretfulness of French infants. This child conducted itself while in the incubator precisely as its predecessor had done. It never cried; it spent its whole time in sleep, and it grew as if it had made up its mind to embrace the career of a professional giant. After a six weeks' stay in the incubator it was removed and weighed; during this brief period it had doubled its weight. It had become so strong and healthy that it resembled a child three years old, and it could actually walk when holding on to a convenient piece of furniture.

These two experiments satisfied Dr. Tavernier of the vast advantages of artificial child incubation. He immediately proceeded, with the permission of the authorities of the hospital, to construct an incubator of the capacity of 400 infants, and in this he placed every one of the 360 infants who were in the hospital on the 10th day of February last. With the exception of one

who died of congenital hydrocephalus, and another who was claimed by its repentant parents, the infants were kept constantly in the incubator for six months, when they were removed in consequence of having outgrown their narrow beds.

The results will seem almost incredible to persons who are unfamiliar with the reputation of Dr. Tavernier, and have not seen the report made to the French government on the subject by a select committee of 12. The average age of the infants last February was eight months and three days, the youngest being less than 12 hours old and the eldest not more than 11 months. Their average weight was 16 pounds, only one of the entire 360 having attained a weight of 32 pounds. At the end of six months of artificial incubation the average weight of each infant was 24 pounds, and there was not one who would not have been supposed by a casual observer to be at least three years old. In other words, six months of artificial incubation did as much in the way of developing Dr. Tavernier's foundlings as three years of ordinary life would have done. The infants were strong and healthy as well as big; they walked within a week of leaving the incubator, and most of them have since learned to talk. These results surpassed Dr. Tavernier's most enthusiastic expectations, and there can be no doubt that his system of artificial child incubation will be adopted not only in every child's hospital in France, but in every private family throughout the civilized world.

Too Fat.

The tendency to accumulate fat is constitutional; but it can either be checked or encouraged by the individual in whom this tendency exists. In spite of all protestations to the contrary, fat persons eat heartily; they may not consume as much food as some who are lean, but they require less, because there is more assimilation; that is, the nutrient portions of the food are more readily converted into fat, and there is less waste. All medicines that cause a reduction of fat do so at the expense of the general health. Bottled anti-fat remedies are simply bottled diseases, since it would be impossible to reduce the amount of adipose with one bottle or a hundred bottles of it, unless it was sufficiently powerful to derange the natural and healthful functions of the body and induce disease. It would be safer to accomplish the object by contracting fever and ague, or even small-pox.

There is a method, however, of reducing excessive fatness, which is not only safe but healthful, and which will insure greater comfort, and perhaps longer life to the individual. That is by the moderate use of the fat-producing foods, which are those containing starch or sugar. The individual should not discard them altogether, as was suggested by Banting, because in so doing obesity is generally changed for something worse, in form of fatal kidney diseases. An over-fleshy person should make a "bill of fare" for himself on a descending scale as to nitrogenous or fat-producing foods, and an ascending scale as to nitrogenous foods. He should diminish the quantity of wheat bread eaten at each meal down to one or two ounces; the same for fats and potatoes, and make up the deficiency with lean meats and bread made from graham flour, etc.

FATAL ACCIDENTS IN 1882.—The *Pittsburg Commercial Gazette* has evidently been keeping account of all the disasters occurring in 1882. The result is given out editorially in a recent issue of that journal, and only requires comparative statistics from former years to possess more interest, if not value. The totals are:

Tornadoes.....	590
Boiler explosions.....	198
Fires.....	128
Powder explosions.....	83
Falling buildings.....	72
Fireworks explosions.....	43
Deaths on lake.....	160
Floods.....	163
Mining explosions.....	152
Struck by lightning.....	26
Snow slides.....	81
Dynamite explosions.....	11
Death on the rails.....	320

Fatal calamities, by reason of railroad disasters, are thus seen to be by far the most numerous, yet feared by the public probably considerably less than death by flood or fire.

POISONING WITH WASHING SODA.—The *Pharmaceutical Journal* reports a case of poisoning of a child five years old from drinking a solution of washing soda, which occurred in Greenwich, England. The evidence of the mother was that on Wednesday she left the child at home by herself, and during her absence the child drank some water from a kettle on the hob in which witness had placed a handful of common washing soda to cleanse it before leaving home. On her return she gave the child some magnesia, and she vomited and did not appear much the worse, but the next day the symptoms were alarming, and she went to the Relieving Officer and obtained an order for medical attendance. On Dr. Hartt seeing the child he found her in a dying state, and gave no hopes of her recovery, and she died on Thursday afternoon. The child was in the habit of drinking from the kettle. Dr. Hartt, the parish surgeon, said the appearances of the child were consistent with alkaline poisoning, and the child must have suffered great pain. Three ounces of common soda dissolved in water had been known to kill an adult, and the deceased was presumed to have taken about an ounce. The jury returned a verdict that the deceased died from drinking common washing soda and water from a kettle by misadventure.

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SAN FRANCISCO:
Saturday Morning, Feb. 10, 1883.

TABLE OF CONTENTS.

EDITORIALS.—The State Mining Bureau, 89. Manufacture of Ice, 89-96. Fasting Events; Academy of Sciences; Protection of Miners; Banner Quartz Mine, 96. Construction and Care of Dams; Temperature in Mines; Improved Boiler Scrapping Attachment, 97. Patents and Inventions, 100.

ILLUSTRATIONS.—Compressor for Mining Work or Ice Manufacture, 89. Method of Timbering in Stones; Lakenan's Boiler Scraper and Cleaner, 97.

MECHANICAL PROGRESS.—A Year's Metallurgical Progress; Dispensing with Puddlers; Wood vs. Iron in Fire, 91.

SCIENTIFIC PROGRESS.—What the Telescope Has Done for Astronomy; the Luminescence of Flame; The Sun's Distance; Chemistry of the Electrical Accumulators; Electrical Progress; Electro Fluid and Fire Batteries, 91.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Assessments, Meetings and Dividends, 92.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, New Mexico and Oregon, 92-3.

USEFUL INFORMATION.—Vanderbilt on Fast Locomotives; Molecule Structure of Metals; Payment from First Earnings of a Machine; New Method of Silvering Mirrors; Olive-oil for Preserving Skins, 95.

GOOD HEALTH.—Artificial Child Incubation; Too Fat; Fatal Accidents in 1882; Poliooning with Washing Soda, 95.

MISCELLANEOUS.—Denver Exposition—No. 24; Hydraulic Pump; Big Hydraulic Mines, 90. Eastern Utah; Botany in the Land of the Apaches; Denosits and Lodes in the Mining Law; Right of Way of Mining Ditches, 94. Dust Explosions in Mines, 95.

CORRESPONDENCE.—Notes from Eureka, Nevada, 97.

Business Announcements.

Pacific Mutual Life Insurance Co., S. F.
Cyclopedia—Phillips & Hunt, S. F.
Dividend Notice—Navajo Mining Company, S. F.
Dividend Notice—Standard Con. Mining Company, S. F.
Dividend Notice—Kentucky Mining Company, S. F.
Engineer—W. C. Johnson, Fitchburg, Mass.
Cylinder Oil—Tatum & Bowen, S. F.
Sawmill Machinery—Tatum & Bowen, S. F.

Passing Events.

There is little new to note from the mining regions this week, aside from what our Mining Summary relates. The cold weather retards mining operations, as a general thing, a good deal of out-door work being stopped. The freezing up of ditches, etc., has put the miners to great inconvenience.

Though the Legislature has been some weeks in session, very little has been done, so far, in making laws. One "debris bill" has been killed. Another one has been introduced this week, declaring hydraulic mining a "public nuisance," which is an odd title to give to an industry yielding \$14,000,000 of gold a year to the world.

So far, indications are not very favorable for a good water season this spring. The dry winter somewhat discourages the hopes of the miners.

THREE miners, R. S. Ehler, Joseph Griffin and James McKee, were killed by a cave in the Esmeralda mine, at Deadwood, Dakota. Thirty men were at work in the mine, but were warned by cracking timbers and escaped. The above-named went back after their coats, and were caught in the tunnel.

GILMER & SALISBURY intend putting on four-horse coaches between Ward and Eureka, Nevada. This is owing to the increased bullion output from the Martin White mine, at the former place.

Protection of Miners.

It may not be generally known that there is a law in force for the protection of miners, providing for more than one mode of egress from mines lower than a certain depth. This Act was passed March 13th, 1872. An act to amend this, introduced by Mr. Reddy at this session of the Legislature, has been approved by the committee, and passed the Senate. It is numbered Senate Bill No. 86, and is as follows:

Sec. 1. It shall not be lawful for any corporation, association, owner or owners of any mining claim, within the State of California, to sink down into such mine or mining claim any perpendicular shaft or incline beyond a depth from the surface of 300 ft., without providing a second mode of egress from such mine, by shaft or tunnel, to connect with the main shaft at a depth of not less than 100 ft. from the surface.

Sec. 2. It shall be the duty of each corporation, association, owner or owners of any mine or mines in this State, when it becomes necessary to work such mines beyond the depth of 300 ft., to proceed to sink another shaft or construct a tunnel so as to connect with the main working shaft of such mine as a mode of escape from accident in or about such mine or works.

Sec. 3. When any corporation, association, owner or owners of any mine in this State shall provide for the proper egress as herein contemplated, and where any accident shall occur, or any miner working therein shall be hurt or injured, and from such injury might have escaped if the second mode of egress had existed, such corporation, association, owner or owners of the mine where the injuries shall have occurred shall be liable to the person injured in all damages that may accrue by reason thereof, and an action at law in a court of competent jurisdiction may be maintained against the owner or owners of such mine, which owners shall be jointly and severally liable for such damages. And when death shall ensue from injuries received from any negligence on the part of the owners thereof, by reason of their failure to comply with any of the provisions of this act, the heirs or personal representatives of the deceased, or in case the deceased was a minor at the time of his death, by the father of the deceased, or in case of his death or desertion by him of his family, the mother or guardian may commence an action for the recovery of such damages as are provided by section 377 of the code of Civil Procedure.

Sec. 4. It shall be unlawful for any corporation, association, owner or owners of any mining claim, while engaged in sinking any shaft or incline, or working in or through such shaft or incline where there is no second way of egress or escape from such shaft or incline, and where steam hoisting works are used as the means of hoisting men and material out of such shaft or incline, to leave the said hoisting works in charge of but one person while any person may be engaged in working said shaft or incline, or in any opening therefrom beneath the surface.

Sec. 5. This act shall take effect and be in force from and after its passage.

Most people will probably be impressed with the fact that it would be difficult to enforce such a law as this without working a hardship on a certain class of miners. If, as soon as a man has a 300-foot shaft on his mine, he must immediately stop work sinking, until he has put down another 300-foot shaft, it is highly probable he will stop at 299 ft., unless he finds something to pay. Tunnels are only possible in few localities. Mining is a hazardous occupation, and every possible safeguard should be thrown around the men who follow it. Still, some chances must be taken, and it is hardly politic to enforce such measures as will retard development. In many instances the enforcement of a law requiring a supplemental safety shaft would cause the closing down of the mine altogether.

QUICKSILVER BY THE FLASK.—A new department in the sale of quicksilver is announced by Mr. J. B. Randol, who will in the future sell the celebrated A brand (from the New Almaden mine) by the flask. Heretofore the product has always been quoted by the pound. The new way is in conformity with the custom in London, the great market of the world. The flasks all contain 763 pounds, and the quotation is "\$26.50 per flask, with price subject to change without notice." Car-load lots will be shipped from San Jose, for Nevada, Arizona and New York, or delivered at the P. M. S. S. Co's wharf and depot of S. P. R. R., S. F., without charge. The railroad rates from San Jose are the same as from Santa Clara. There is no reason why quicksilver should not be quoted by the package in this way as is the case with most other products.

A PROSPECTOR gives this way of telling mines belonging to incorporated companies: "When no one will tell you anything about a property, and the only knowledge to be obtained is by what one can pick up by one's own observation, the mine may be set down as belonging to a company." We concur. And it may be added that most mines evidently belong to incorporated companies, or else the above theory is incorrect.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday evening, Prof. Davidson in the chair. Count J. Lambertenghi, Italian Consul, Dr. Paolo de Vecchi, Wm. R. Eckert and S. B. Leavitt were elected resident members, and Henry B. Osgood, Dr. F. V. Hopkins, Miss M. H. Jones and Mrs. Donald McLennan were proposed for resident membership.

The Council announced the appointment of the following curators in the different departments for the year: On birds and mammals, E. F. Lorquin; fishes, Charles G. Yale; radiates, reptiles and crustacea, J. J. Rivers, Curator of the State University Museum; ethnology and osteology, A. B. Stout, M. D.; botany, Justin P. Moore and M. K. Curran; entomology, H. Herman Behr, M. D.; conchology, Josiah Keep; mineralogy, C. D. Gibbs and J. T. Evans; geology and paleontology, Edward Booth.

The following members of the Academy have recently formed a microscopical section: J. P. Moore, Henry Ferrar, W. F. Meyers, Dr. F. V. Hopkins, M. K. Curran, M. D., Chas. G. Yale and George Davidson.

A letter from the Board of Trustees announced that that body had elected Geo. E. Gray, President; Thos. P. Madden, Vice-President, and C. W. Brooks, Secretary.

Mr. J. W. Forsyth read a paper on "Cinchona and the Method of its Cultivation in Ceylon and East Indies."

J. G. Lemmon read a continuation of his paper on "The Potato," this portion being mainly a compilation of facts connected with the history of the potato as an edible.

President Davidson announced that the observer at the tide gauge at Fort Point reported that the temperature of the sea water along the coast had ranged lower the past month than for 25 years past.

Banner Quartz Mine.

This mine, located four miles north of Oroville, is the principal quartz mine in Butte county. The ledge, or rather lode, courses north and south to the east, the hanging wall being porphyry and the foot wall slate. The thickness of the quartz vein averages from 20 to 24 inches. The mine is opened by a shaft down 300 ft., and about 2,000 ft. of drifts at the 100 and 200 levels. The hoist is steam-power, and of sufficient capacity to sink the shaft 1,000 ft. There is also a new and finely equipped 10-stamp mill on the property. The ore is free-milling, and contains but a very small percentage of low-grade sulphurets.

Like most of the Butte county quartz mines, the Banner is not uniform or regular in the gold yield of its ore. In the aggregate, about 10,000 tons of ore have been milled, and have yielded \$600,000, an average of \$60 per ton. This is a showing that very few of our California quartz mines can equal. Taking into consideration the little depth that has been explored, it seems probable that the future yield of the mine will be far in excess of its past yield. Work has recently been recommenced, and indications of the existence of a new ore chimney on the 200 level found.

The successful development of this mine will give quite an impetus to quartz mining in the numerous ledges in the vicinity. Many of these latter have proved very rich in the surface workings, but no depth has yet been attained to determine their permanence.

TWO THOUSAND CARS OF BULLION.—The Mingo smelter began operations January 1, 1877, since which it has run most of the time, and yet at one time it laid idle for nearly four months. Its product of lead bullion has been steady and reached an enormous aggregate. Last Saturday it completed its shipment of 2,000 cars, which were sent East. The average was a little over 13 tons to the car, making an aggregate of over 26,000 tons. Most of the ore is brought to the smelter by rail, and all the fuel and fluxes are delivered to the works by the car load, and it is estimated that it required nearly 10,000 car loads of ore, iron, limestone, charcoal, coke, coal, etc., to produce this vast pile of bullion. With such figures as above, one can readily see the important part railroads perform in a successful smelting enterprise, like that of the Mingo Furnace Company.—*Salt Lake Tribune.*

THE Grass Valley Union says that the impression prevails that the coming season is going to be more active in quartz mining than for several years past, as some new operations are getting under way, and others that have been taking a rest will be started up, and then the introduction of water power is looked for to give an additional stimulus to the business.

THE last big pearl caught in the Gulf of California sold for \$14,000.

Manufacture of Ice.

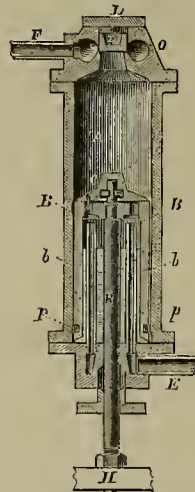
(CONTINUED FROM PAGE 89.)

It has always been a great desideratum to obtain compression without heating the working parts of the machine, and this Mr. Lount has accomplished. All stage compression is avoided, and with a single pressure, without the use of water, the air is highly compressed. It is really high compression without the annoyance of water jackets or water injection in the cylinder. The air can be compressed to any pressure the metal will bear at one time, without the wearing parts being subjected to any injurious heat. It will be well for miners and all using air compressing pumps to examine this one.

In working the ice itself, Mr. Lount constructs a congelator consisting of rows or flat coils of pipe, which are placed in an upright position in the water to be frozen, and supported in such a manner that the sides—top and bottom edges—and one end of the blocks of ice which are formed upon the congelator are not in contact with any solid substance.

A peculiar feature, and a very valuable one also, is the combination with the congelator of an agitator placed in the water and below the congelator, where it can be operated efficiently, and also permit free access at all times to the congelator or blocks of ice above it. With this, the ice formed is solid and clear, and does not come out as "snow ice," as is apt to be the case in still water.

Mr. Lount has invented a process of detaching the ice from the congelator without having to first loosen the same by heat. The blocks of



Section of Lount's Compressing Cylinder.

ice, which weigh from one to three tons each when formed, are prepared by a system of tubes frozen into them, and the blocks are divided through these perforations into pieces convenient for handling. There are several coils of pipe in each congelator, all in the same tank, and the ends of the coils are so connected by means of three-way cocks, placed outside the tank, that either one or more of them can be thrown out of the circuit, while the refrigerant is still allowed to circulate throughout the other coils. When a coil is thrown out of the circuit the ice can be taken off from it at any time without interfering with the formation of the ice in the coils which are still in circuit. Water is drawn into the tank from time to time, as the ice is taken out, and the operations of making and selling ice from the same tank can be carried on simultaneously and continuously by this means. In fact, there is no store-house required, as ice is kept in the tank where made, and can be taken out as readily as from a store-house.

Mr. Lount has made several of these machines, which are now in operation. Several new machines are also contracted for. The compressors are all made on this coast, and seem to be giving satisfaction wherever used. That in operation at Guaymas is the property of Wm. B. Hooper & Co., of this city.

THE Bonanza King mine still continues to do credit to its name. For the week ending Jan. 24th the bullion shipments consisted of eight bars of silver weighing 15,000 ounces, making a total shipment for the month, to that date, of \$48,000. A 10-stamp mill is turning out the bullion.

INDIANS are reported to be depredating in New Mexico. The Gila valley is again alarmed, and settlers are fearful of the repetition of the occurrences of last April.

Construction and Care of Dams.

Probably never in the history of the State has so much public attention been called to the questions connected with dams as of late, since the debris question has been discussed. The miners and the engineers, however, have always been greatly interested in these structures, of which there are so many in the mountains of California, doing duty in holding back the water supply for use in the drier seasons of the year. A case of some interest connected with the construction and care of dams has just been decided in Sierra county, and the result will serve to put careless people on their guard, in view of prospective damages in case of accident. The action was brought by the South Branch Water Co. against the Sierra Butte Gold Mining Co., to recover damages for washing away a bridge by the breaking of defendants dam, located at the outlet of Sardine lake.

There were two questions of fact to be considered: first, as to the care taken in the construction of the dam; second, the care taken of the dam after its construction.

The dam was constructed of logs, and from the evidence of I. G. Jones, a civil engineer, it appears the rafters of the dam were 14 ft. apart, and that they should have been seven. That the mudsills should have been sunk deeper in the ground, and that the spiling in front of the dam should have been sunk to the depth of at least six feet at the outlet of the lake, in the ravine at the point where the dam broke; the mudsill was three feet above the bed of the ravine, and that the double plank of two inches in thickness, or spiling in front of that mudsill extended below the bottom of the ravine three feet. It was also in evidence by Mr. Jones, that there should have been additional waste gates, that the water of the dam could be drawn off so as to guard against casualties, and to enable persons to repair the dam, etc. The dam was completed about the middle of July, 1881. Its height at the back of the dam above the ravine was 26 ft. At the north end of the structure a waste-way was constructed of 100 ft. in width, which, from its unusual width, would appear to be intended to prevent the water from being raised above a certain height, and for the protection of the dam. On the 19th day of July, 1882, the dam broke at the deepest point in the ravine, and was carried out by the force of the water. The break was 50 feet at the bottom and 71 feet at the top. About a week or 10 days previous to the breaking, the waste gate was planked up and the water of the lake was raised at least 15 inches above its previous height, or that intended by the construction of the dam.

On the 17th day of July, 1882, more than the usual amount of water was running out from under the dam, and one of the rafters (the second one from the top) near the center of the dam was breaking at that point. The structure appeared sunken. On the next day, July 18th, the dam was heard to crack, and the gate through which the defendants drew water from the lake for mill purposes was raised two inches. The lake contained an area of 160 acres.

Judge A. J. Howe rendered the decision which is published in the *Mountain Messenger*. The Judge says: Considering these facts it appears to the court, that the ravine widened and became deeper, descending from the front to the back of the structure, so that it does not appear how little or much support the spiling received from the earth behind it. The increased flow of water two days before the breaking, under or through the spiling, was the ultimate cause of the disaster, and that the spiling was inadequate for the purpose it was intended. The raising of the water, by closing the waste gate, appears to have been unwarrantable, as the dam very soon after appeared to be in a very critical condition, so much so that decided means should have been taken to relieve it, by drawing off the water of the lake.

The raising of the gate, two inches on the 18th, could not have given immediate or adequate relief to the dam, and this appears to be all that was done on that day to prevent the disaster that followed on the morning of the next day.

There appears to have been a gross neglect of duty, on the part of defendants, in the construction of the dam, and its care, considering the risks and damages likely to accrue to others, precipitating such a large body of water into the stream below their reservoir.

Judgment was entered for the plaintiff for the amounts prayed for, with costs.

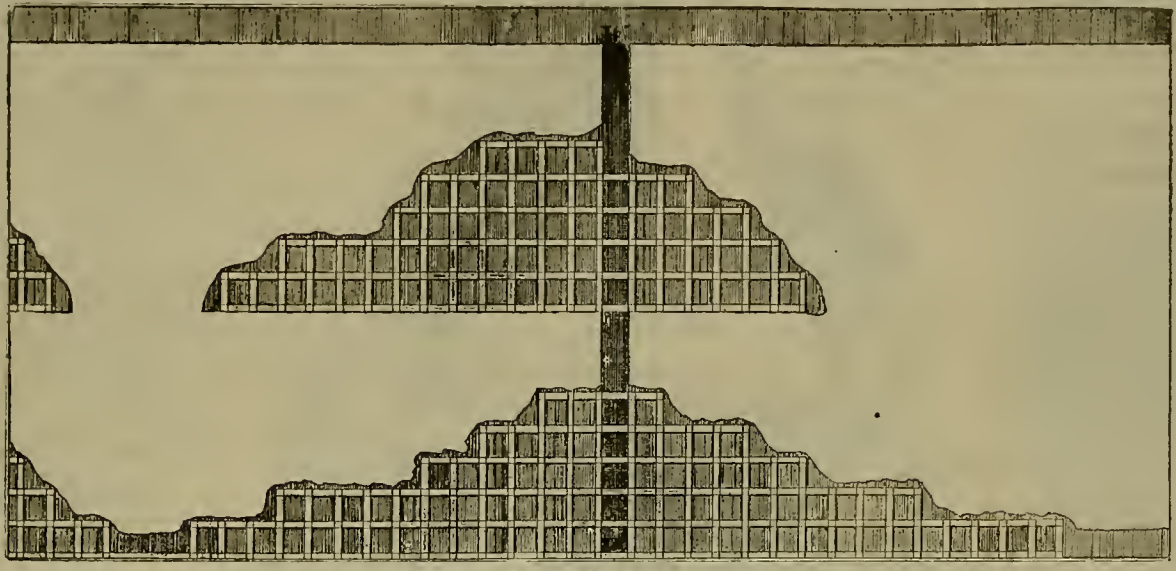
Temperature in Mines.

The increase of temperature which accompanies increase of depth is the main cause which it is necessary to consider as limiting the depth at which it may be practicable to work. In this country the temperature of the earth is constant at a depth of about 50 ft., and at that depth the temperature is about 50° Fahr. The rate of increase of the temperature of the strata in the coal districts of England is, in general, about 1° Fahr. for every 60 ft. of depth. In some instances the increase is very irregular, being probably affected by local conditions, such as percolation of warm or cold water and varying conductive power of the rocks penetrated. These cases, however, are exceptional, and throw no doubt upon the general conclusion that the rate of increase amounts, as a rule, to about 1° Fahr. to every 60 ft. It may be observed in passing that whenever artesian wells have been sunk in this or other countries the rate of increase is in close harmony with that observed in English coal mines; but, on the other hand, by observations made in Belgian coal mines, the rate of increase appears to be less than in English colliers, though it is quite possible that this

Improved Boiler Scraping Attachment.

The accompanying engraving represents a new boiler scraping and cleaning attachment, recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by J. M. Lakenan, of Grass Valley, Nev. county. It consists of a globe joint and stuffing box, through which a three-fourth inch steel scraper rod passes, with the scraper or brush attached, circled to fit the boiler. The scraper can be worked on bottom or sides, as high up as the tubes. The object of this invention is to enable the engineer to broom back any accumulation of scale or sediment on the bottom of the boiler to the blow-off pipe, and blow the same out of the boiler. This can be done while in use, and without running down steam or in any way interfering with the working of the machinery, which costs money and time.

The inventor says that it is well known by engineers that a few pounds of scale or sediment on the bottom over the fire will, in a few days, cause a blister or crack in the boiler, and should the opening be large enough, will throw the boiler out of its seating, and be called an explosion from some unknown cause, there being



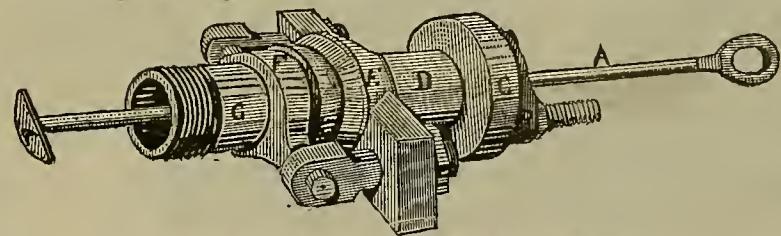
METHOD OF TIMBERING IN STOPE.

apparent difference may have arisen from the thermometer, having been applied in a manner which would not correctly indicate the temperature of the strata. In the metalliferous mines of Cornwall the deviations from the scale of 1° Fahr. for every 60 ft. are very great, but it is very probably that the disturbing causes of variable conduction and percolation of heated water exists to a much greater extent in the geological formations containing metalliferous veins than in the sedimentary rocks embracing the coal measures. The deepest colliery in England is at Rosebridge, near Wigan. The tempera-

ture of the rock, as observed in this shaft, are in general agreement with the ordinary rate of increase to a depth of 1,800 ft., after that the increase becomes considerably more rapid, but it would be rash to conclude from this single example that the increase would in all cases be accelerated when that depth was exceeded. At the lowest point of this shaft the temperature of the earth, as indicated by a thermometer placed in a bore-hole a yard, is 92° Fahr.

Some little time since we gave a table showing the increase of temperature with depth at the Forman shaft, on the Comstock. This was March 25th of last year, so any one interested may obtain the PRESS of that date with the table. At 100 feet the temperature was 50½°; at 2,300 it was 121°. Holes cut not less than three feet deep were drilled into the rock and a slow-acting thermometer of the pattern adopted by the "Underground Temperature Committee of the British Association," was used. The holes were closed with clay and the thermometers were left in for 12 hours, not less than three holes being tried for each point. This will serve as a hint how to proceed to those who may desire to experiment in this direction.

three gangs of water at the time. The engineer in charge cannot at all times shut down and blow off to clean boilers; nor is it convenient to have a spare boiler. In the pumping of mines water is raising while boilers are being cleaned. Mills of various kinds are compelled to run during the week, and boilers neglected. This boiler scraper, being always left in the boiler, can be used any day or hour that the engineer suspects an accumulation, and if it is only removed from its place before becoming baked, it can do no harm, but it can be blown as well. The blowing off does not effect a



LAKENAN'S BOILER SCRAPER AND CLEANER

cleaning except for a few inches surrounding the discharge caused by the current. Thus the necessity of brooming the material back to the blow off pipe, so that the current may catch and carry it out. The rod A. passes through the stuffing box into the boiler, going through the pipe C. and globular head or universal joint D. This globular head D. fits a corresponding socket in the end of the stuffing box, so that the rod and stuffing box may have a movement around the head without leaking. The pipe C. fits into the boiler, being screwed in.

ELECTRIC LIGHTING IN TRAINS.—The Pullman train to Brighton is now lit with 40 instead of 18 incandescent lamps, owing to the employment of the new Faure-Sellon-Volckmar accumulator supplied by the Electrical Power Storage Company. In the first instance 70 Faure accumulators (original pattern) were required for the 18 lamps, whereas now there are only 30 Faure-Sellon-Volckmar cells used for the 40 lights, their total weight being considerably less than half that of the cells originally employed.

Notes from Eureka, Nevada.

[From our Own Correspondent.]

In my letter of last week I told you about my trip to Silverado mountain. It is situated in Pinto mining district, adjoining Eureka district, and is on the line that divides the counties of Eureka and White Pine. It bids fair to become the liveliest little camp in eastern Nevada during the coming summer. A few days ago a certificate of incorporation of the Berryman Tunnel and Mining Co. was filed in the Clerk's office. This concern has been organized under the laws of Nevada, for the purpose of developing six claims located last fall, on the east side of Silverado mountain, a short distance north of the Maryland and Diagonal mines, both of which, as stated in my last letter, are good ore producers. Each of the six claims are 1,500 ft. long by 600 ft. wide, and are so situated as to take in 1,500 linear feet of the mineral zone. It is all virgin ground, of a coarse, broken nature, and with bald croppings from one end to the other. It is proposed to break a face for a tunnel, the point of commencement of which has not yet been decided. Mr. Berryman, the superintendent, who has had a great deal of experience in that section, will again thoroughly examine the ground and report to the company, when the work of development will be commenced.

I learn that the indications in the Hoosac mine are so good that ore may be struck any day. It has the appearance of a good property, and I believe that Mr. Probert's foresight in purchasing it for the Richmond Company will soon become apparent. It is quietly rumored that the Richmond Company are securing new mines in this district, and it need not surprise anybody to find other large companies doing the same thing, as good mines can be purchased cheaply if the investor knows just the right course to pursue.

The tunnel properties are all looking well at present. The Ruby Hill tunnel, which enters Prospect mountain from the west side is a splendid enterprise. It is in only about 120 ft. but ore was struck in it a few days ago. The Company own all of the surface ground under which the tunnel passes.

M. H. JOSEPH.

Eureka, Feb. 5, 1883.

Mine Timbering.—No. 2.

In last week's PRESS we gave the details of forming stope timbers, and herewith give an engraving showing the general arrangement of the timbers in stopes. The timbers are usually of 12-inch stuff, square hewn or sawed. In one mine cited by Mr. Hague, on the Comstock, the posts of the sets of timbers like those we described last week, and such as are here shown, are 7 ft. 2 inches high, including the tenons. These latter 8 inches square, or 8x10, are 9 inches long on the upper end of post, and 2 inches long on the lower end; and as the caps and sills have half-inch shoulders cut for the admission of the ends of the posts, there remain 2 ft. 3 inches in the clear between the sills and caps of each set. The sills and caps 3 ft. 9 inches in the clear, also, have short tenons on each end, and shoulders cut to receive the ends of the posts and horizontal cross pieces. In some cases the method of framing is varied to suit the varying condition of the ground, so that, if the pressure is chiefly a vertical one, the tenons of the posts are cut as described, bringing the ends of each post in direct contact with its neighboring post, above and below, without introducing between them the tenons of the horizontal timbers, which would offer less resistance to a pressure at right angles to the fiber of the wood; while if the pressure be lateral instead of vertical the tenons of the posts are made short, and those of the horizontal timbers long, so that the latter may press directly against each other without the intervention of the post-tenons.

THEY have been having frozen quicksilver at Butte, Montana. When last heard of the thermometer was 48° below zero, with a downward tendency. At the smelter, a mile from town, 60° below is reported.

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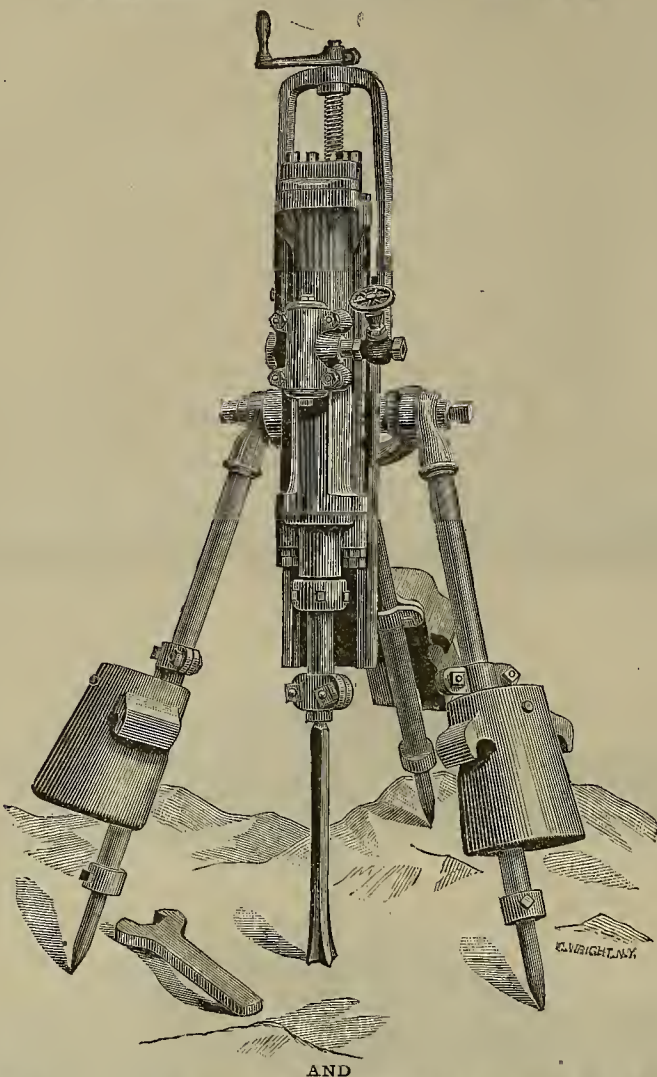
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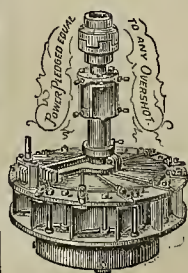
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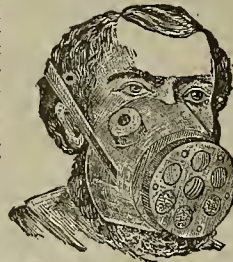
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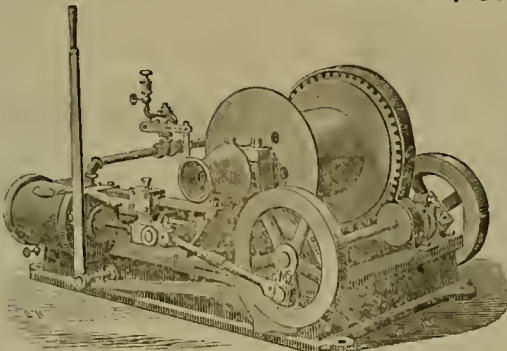
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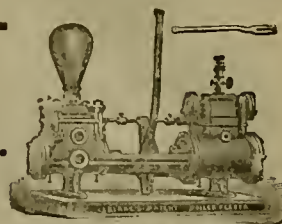
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Mahoney.....	40 ".....	Amador " "
Zelle.....	40 ".....	" " " "
Placerville.....	40 ".....	El Dorado " "
Gross.....	80 ".....	" " " "
Julian.....	20 ".....	Placer " "
St. Patrick.....	15 ".....	" " " "
Providence.....	20 ".....	Nevada " "
Omaha.....	10 ".....	" " " "
Green Mountain.....	60 ".....	Plumas " "
Plumas Eureka.....	60 ".....	" " " "
Pulver-standard.....	30 ".....	Bodie Dis. Mono, " "
Standard.....	20 ".....	" " " "
Noonday.....	30 ".....	" " " "
Bodie.....	10 ".....	" " " "
Christy.....	5 ".....	Utah Co. Utah, " "
Ontario.....	5 ".....	Parley's Park, " "
Contention.....	20 ".....	Tomahstone Dis. Arizona " "
Grand Central.....	20 ".....	" " " "
Harshaw.....	20 ".....	Patagonia, " "
Sunshine.....	20 ".....	Idaho Springs, Col. " "
Homestake.....	20 ".....	Black Hills, Dakota. " "
Father De Smet.....	30 ".....	" " " "
Haddu Treasure.....	40 ".....	" " " "

Superiority of the "Challenge" Ore Feeder Demonstrated!

At the "Christy" Mill, Utah County, Utah, the "Eclipse" Feeders, (conceived by E. Coleman) were introduced, but not carrying a regular supply of ore for the crushing capacity of the stamps, were replaced by the "Challenge," which are now running and the stamps crushing forty (40) per cent. more ore than was done by the "Eclipse."

The "Harshaw" or "Hemosa" Mill, of Patagonia District, Arizona, was also originally fitted with "Eclipse" Feeders, but after a few weeks trial they were pronounced inadequate to the work, discarded, and the "Challenge" adopted.

The "Silver King" Mill of Arizona, also removed the "Eclipse" Feeders to give place to the "Challenge."

The "Soia" Mill, of Brown's Valley, Yuba County, Cal., was fitted with "Victor" Feeders, manufactured by E. T. Steen, but proving insufficient, the "Challenge" Feeders were substituted.

Four of the "Victor" Feeders, manufactured by E. T. Steen, were also placed in the "Alexander" Mill, at Grantsville, Nevada, but after a fair trial were discarded, and Henry's Feeders fitted, and four others of the same pattern adopted when the second twenty stamps were erected.

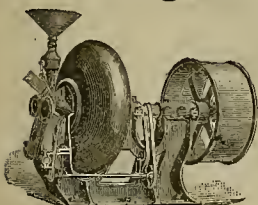
These cases are simply cited from among many similar instances, in proof of the vast superiority of the "Challenge" Feeders over all others.

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Machine Works 49 and 51 Fremont Street, San Francisco.

Manufacturer of Quartz Saw Mill and General Machinery. Also Agent for BAKER ROTARY PRESSURE BLOWERS, and WILBRAHAM ROTARY PISTON PUMPS. P. BLAISDELL & CO.'S Machinists' Tools. HOT POLISHED SHAFTING from the Akron Iron Company, of Akron, Ohio.

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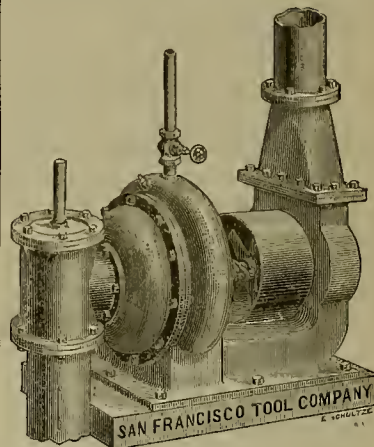
Dug's Mechanical Atomizer or Pulverizer.

For reducing to an impalpable powder all kinds of hard and brittle substances, such as QUARTZ, EMERY, CORUNDUM, GOLD AND SILVER ORES, BARYTES, COAL,

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It is simple and not liable to get out of order. Revolving Shell being constructed of Siemens-Martin steel, and all parts mechanical in design and of first-class construction. Weight 5,500 lbs.; heaviest piece, 1,500 lbs. It will pulverize 7 to 10 Tons in 10 Hours with 50 H. P. For circulars and full particulars apply to or address,

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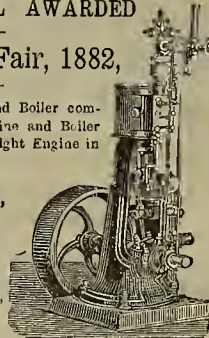
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Machine and

Engine Works,

109 & 111 Beas St.,

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Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

WEEK ENDING JAN. 30, 1883.

271,294.—TWO WHEELED VEHICLE—W. T. Adel, San Jose, Cal.
271,305.—AMALGAMATOR—A. C. Brown, Michigan Bluff, Cal.
271,214.—ADJUSTABLE GRATE FOR STOVES—John Brower, Woodland, Cal.
271,426.—TREADLE FOR SEWING MACHINES, ETC.—H. Cramer, Sonora, Cal.
271,429.—FIRE ESCAPE—J. E. Davis, Union, Oregon.
271,228.—HORSESHOE—Thos. Doyle, S. F.
271,463.—BOOKING APPARATUS—H. L. Howse, S. F.
271,468.—PRINTER'S PROOF PRESS—B. F. Jacobs, S. F.
271,352.—CUT-OFF VALVE GEAR—Eugene O'Neill, S. F.
271,355.—INCUBATOR—John Peterson, Oakland, Cal.
271,364.—FOOT WARNER—Joel Robinson, La Grande, Oregon.
271,366.—PURIFYING SODA ASH—E. H. Russell, Park City, U. T.
271,368.—WOOD TURNING LATHE—A. I. Sanborn, S. F.
271,531.—VEHICLE WHEEL—Z. Sprague, Stockton, Cal.
271,557.—SLASH BOARD FOR WATER CLOSETS—Wm. Welch, J. Coughlin and J. J. Mahoney.
NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

CURIOUS MINING ACCIDENT.—On Friday night, while working a power drill in one of the drifts of the Idaho mine, one of the clamps holding the column became loose, and caused the drill to fall. As the compressed air was on with a full head the drill continued to drive its lighting blows at random, and to the great danger of William Rogers and James Richards, who were working it. In the caving of the machine, before the compressed air was shut off, Rogers was bruised about the breast, hips and legs, and Richards had one of his fingers mashed, but none of the injuries were of a serious nature.—*Grass Valley Union.*

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company.

San Francisco, January 25, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 15, of five cents (5c) per share, was declared, payable on Monday, February 12, 1883. Transfer books closed on Friday, February 2, 1883, at 3 o'clock P. M. This dividend is payable at the Farmers' Loan and Trust Company in New York on all stock issued there, and at the office in this city on all stock issued here.

WM. WILLIS, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Kentuck Mining Company.

San Francisco, February 6, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 34, of Ten Cents (10c) per share, was declared, payable on MONDAY, February 19, 1883. Transfer books closed on Tuesday, February 13, 1883, at 3 o'clock P. M.

J. W. PEW, Secretary.

OFFICE—Room 16, No. 310 Pine Street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, February 2, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 51, of Twenty-five Cents (25c) per share, was declared, payable on MONDAY, February 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WM. WILLIS, Secretary.

OFFICE—Room No. 29 Nevada Block, No. 309 Montgomery street, San Francisco, California.

ANNUAL STATISTICIAN of 1882.—"It is the most complete and accurate work of its kind in the world."—S. F. Call. Address L. P. McCarty, 502 Taylor st. Price, \$4.

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Is not signing a pledge or taking a solemn oath that cannot be kept, because of the non-removal of the cause—liquor. The way to make a man temperate is to kill the desire for those dreadful artificial stimulants that carry so many bright intellects to premature graves, and desolation, strife and unhappiness into so many families.

It is a fact! BROWN'S IRON BITTERS, a true non-alcoholic tonic, made in Baltimore, Md., by the Brown Chemical Company, who are old druggists and in every particular reliable, will, by removing the craving appetite of the drunkard, and by curing the nervousness, weakness, and general ill health resulting from intemperance, do more to promote temperance, in the strictest sense than any other means now known.

It is a well authenticated fact that many medicines, especially 'bitters,' are nothing but cheap whiskey vilely concocted for use in local option countries. Such is not the case with BROWN'S IRON BITTERS. It is a medicine, a cure for weakness and decay in the nervous, muscular, and digestive organs of the body, producing good, rich blood, health and strength. Try one bottle. Price \$1.00.

DIVIDEND NOTICE.

OFFICE OF THE

Navajo Mining Company.

San Francisco, February 2, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 6, of Twenty-five Cents (25c) per share, was declared, payable on TUESDAY, February 13, 1883. Transfer books closed on Wednesday, February 7, 1883, at 3 o'clock, P. M.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine street, San Francisco, California.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Company

ASSESSMENT, NO. 44,

Levied..... January 10, 1883
Delinquent..... February 15, 1883
Day of Sale..... March 3, 1883
Amount per Share..... Fifty Cents

ALFRED K. DUBROW, Sec'y.

Office—Room 69, Nevada Block, 309 Montgomery St.

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Profitable Investments in Valuable Patents made for Capitalists by

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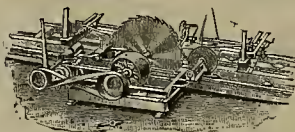
Room 14, 320 California St. (over Wells & Fargo Bank), SAN FRANCISCO, CAL.

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A CHEAP ORE PULVERIZER.

We have on sale, at a very low price, a RUTHERFORD ORE PULVERIZER, which is in perfectly good order in a strong frame, with pulley, etc., all ready for work. It has only been used a couple of months, and is as good as new.

This is a good opportunity for anyone wanting a Pulverizer of moderate capacity for a low price. Address, DEWEY & CO., 252 Market St., S. F.



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Manufacture Robbs' Patent

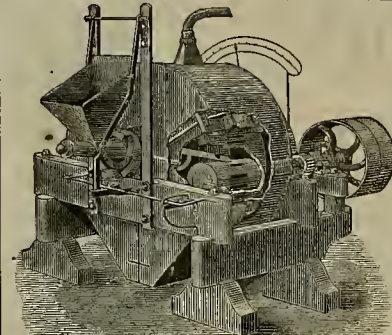
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WORKS ORE WET OR DRY

MANUFACTURED AT
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By W. I. TUSTIN, Inventor and Patentee.

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Manufacturing
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Also Chemical
Bricks for Glover
Tower.

Removal of Office of
Judson Manufacturing Co.

NOTICE!

SAN FRANCISCO, January 2, 1883.

On and after January 4, 1883, the OFFICE AND SALES-ROOM of the JUDSON MANUFACTURING CO. will be located at 329 Market Street, San Francisco, where we shall carry a full line of Goods of our own manufacture, such as Files, Tacks, Brads, Shoe, Box and Finishing Nails, Hardware and California Victor Mowing Machines

Judson Manufacturing Co.

San Francisco Pioneer Screen Works

J. W. QUICK, MANUFACTURER.

Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

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HIGHEST PRICES PAID FOR

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THE CELEBRATED A BRAND.

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For sale in any quantity. Trademark A on top of Flasks secured by United States Patent, and registered. Flasks contain 70½ lbs. Quicksilver. Weight and purity guaranteed.

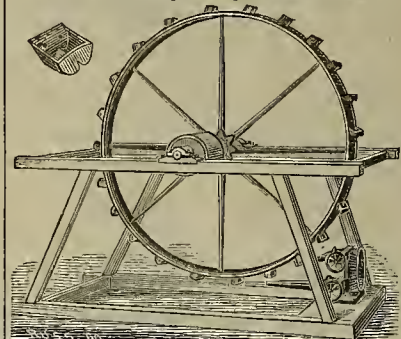
CARLOAD LOTS will be shipped from San Jose, f. o. b., for Nevada, Arizona, New Mexico, Montana and Idaho or Utah, or delivered at Pacific Mail Steamship Co.'s wharf, and Depot of S. P. R. Co., San Francisco, without charge. Railroad rates from San Jose are the same as from San Francisco.

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Reaction Hurdy Gurdy Water-Wheel.



This Wheel will be guaranteed to purchasers to give 83% of the theoretical power of water. Ask Send for circular to L. A. PELTON, Nevada City, Nevada Co., Cal.

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ALBANY CYLINDER
OIL

Has its globe undisturbed, stands a fire test of more than 500 degrees, is perfectly free from acids or oxygen, clings with more tenacity to the metal, and better resists the great pressure and heat of steam than any other lubricant.

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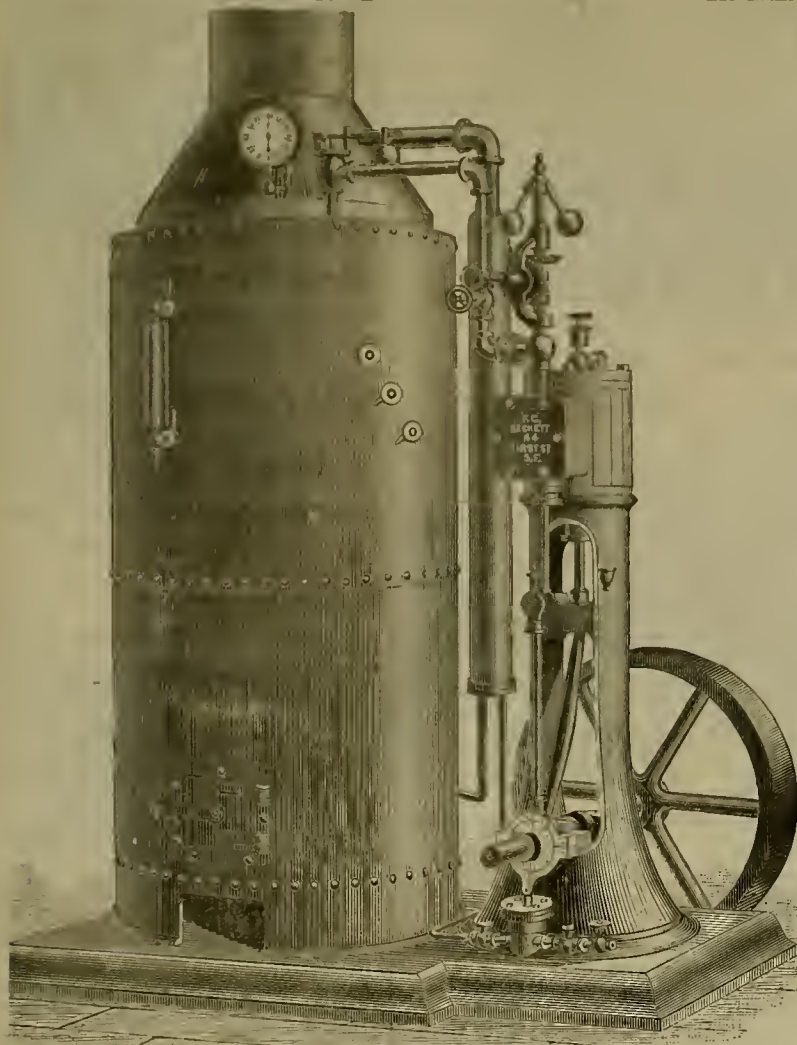
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High elevation, dry air, few fogs and norther.

No brush or fences on the land, which is especially adapted to the culture of the orange and raising grape.

Near to church, school, store and depot.
Hotel open. Telephone Communication.

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Located on the Shore of San Francisco Bay.

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The Granite Stone from this Penryn and Rocklin Quarries was declared by experts at the Philadelphia Centennial Exposition to be the

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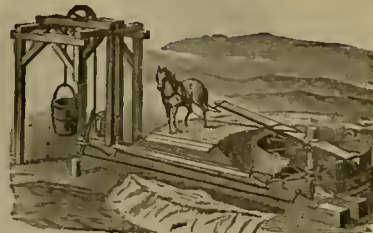
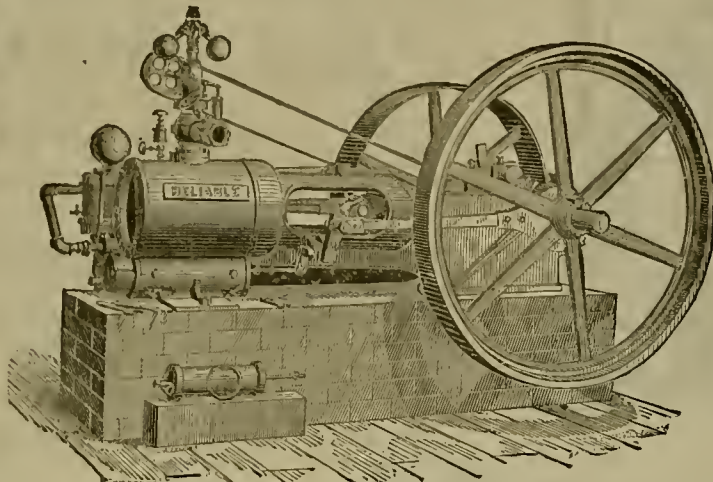
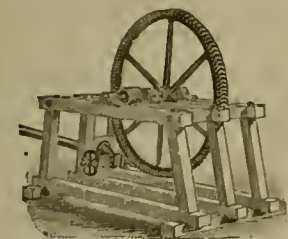
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Water Buckets.
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HORIZONTAL AND VERTICAL ENGINES
1 to 100 Horse Power.



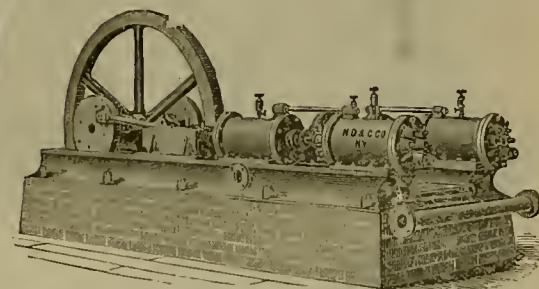
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Mining Water Wheel.
OVER 200 IN USE IN CAL.



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One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The whim is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of the whim is bolted to bed-timber, thus avoiding all fram work. When required these whims are made in sections to pack on mules.

NATIONAL DUPLEX COMPRESSOR.



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MANUFACTURERS OF IMPROVED AND APPROVED FORMS OF

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For working gold and silver ores by wet or dry crushing. The Stetefeldt, Howell's Improved White, Brunton's & Bruckner Furnaces, for working base ores. Rotary Dryers, Stetefeldt Improved Dry Kiln Furnaces.

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Wire Rope, Safety Cages and any Size and Forms of Cars.

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LEACHING MILLS,

Improved Corliss and Plain Slide Valve Meyer's Cut-off Engines.

CORLISS ENGINES from 12x36 Cylinders to 30x60. PLAIN SLIDE VALVES from 6x10 to 36x36. BOILERS of every form, made of Pine Iron Works C. H. No. 1 Flange Iron, or Otis Steel. Workmanship the most careful. All Rivets Hand Driven.

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HERCULES SLAYING THE GIANTS.

HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretensions claims by others.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade

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MANUFACTURERS OF

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National Iron Works,

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MRS. D. S. ROHLWING,
St. Helena, Napa Co., Cal.

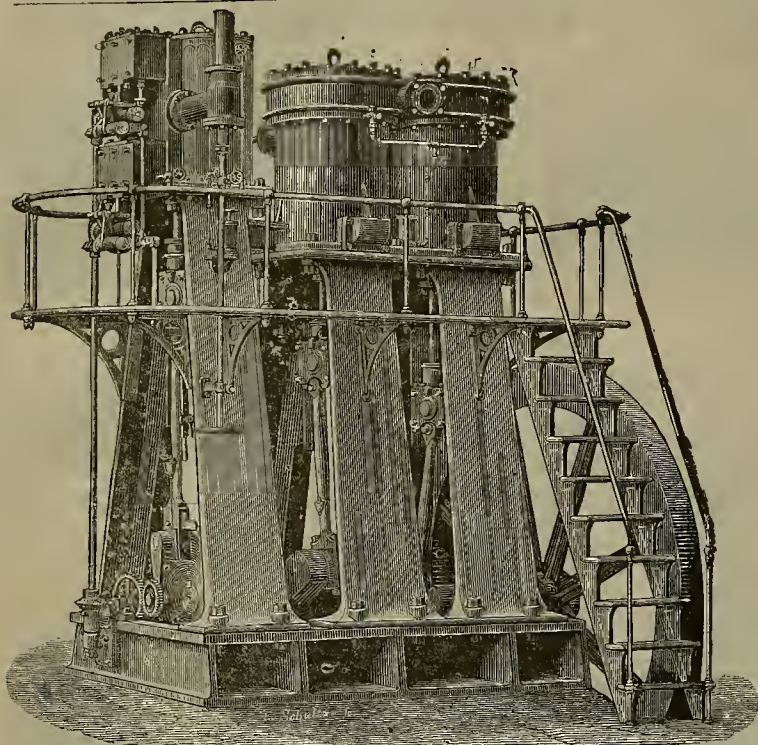
Inventors' Institute

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PARKE & LACY,

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AIR COMPRESSOR.

SPECIAL ADVANTAGES.

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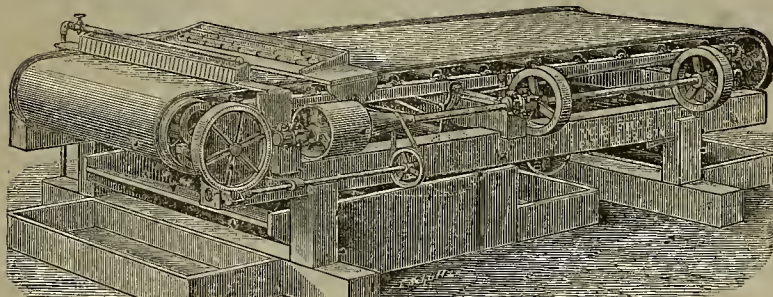
Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

\$1,000 CHALLENGE!



THE FRUE ORE CONCENTRATOR,

—OR—
VANNING MACHINE.

Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order, and ready to make tests, at the office of Hinckley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ore is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

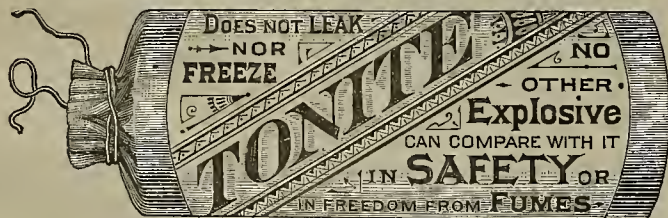
That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

Room 7, 109 California Street, - - - - - SAN FRANCISCO, CAL.
Nov. 6, 1882.

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Inventors MODEL MAKER.
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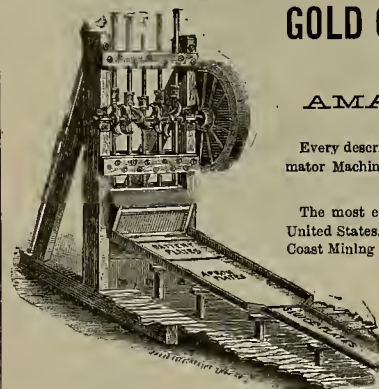
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Old Mining Plates Replated. Old Plates bought, or gold separated for low percentage of result.

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MANUFACTURED UNDER ALFRED NOBEL'S ORIGINAL AND ONLY VALID PATENT FOR NITRO-GLYCERINE POWDERS
All Nitro-Glycerine Compounds, for instance, so-called HERCULES, VULCAN, VIGORIT, NITRO-SAFETY Powder, Etc., are infringements on the Giant Powder Co.'s Patents.

THE GIANT POWDER COMPANY

Call Special Attention to their Improved Grades of Powder.

- NO. 1.—The most Powerful Explosive Compound now in use here.
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- NO. 3.—This grade is a Strong and Reliable Powder, which does excellent work.

JUDSON POWDER

Is now used in all large Hydraulic Claims, and on most Railroads. It breaks much more ground, and obviates reblasting by breaking much harder. TRIPLE FORCE CAPS AND ALL GRADES OF FUSE.

The Giant Powder Company have also purchased from Mr. Nobel, the inventor of Nitro-Glycerine, his latest invention, known under the name of

NOBEL'S EXPLOSIVE GELATINE

This explosive is from 50% to 60% stronger than the strongest Nitro Glycerine Compound and impervious to water. Even hot water does not diminish its strength. We are now introducing the same.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 17, 1883.

VOLUME XLVI.
Number 7.

Cleavage of Minerals.

This is the property possessed by many crystallized and crystalline minerals, of splitting in certain directions more readily than in others; affording shining surfaces, sometimes curved, but usually plane, called cleavage planes. These cleavages are spoken of as perfect when very smooth, less perfect or imperfect when the new surfaces are somewhat irregular. Sometimes cleavages are spoken of as highly perfect, very perfect, perfect, imperfect and very imperfect. Thus, calcite has a highly perfect and quartz a very imperfect cleavage.

The cleavages are usually parallel to the faces of one of the simpler "forms," consequently they render great assistance to the crystallographer by giving him certain fixed points to start from in "reading" a crystal.

The student should obtain specimens of such easily cleavable minerals as galena, fluor, blende, calcite, etc., and endeavor to obtain from them the different cleavage forms. Thus, from fluor he may get the octohedron and acute rhombohedron, from galena the perfect cube, from blende the rhombic dodecahedron, and from calcite the rhombohedron. By laying the mineral upon a thin cushion or leather pad, placing the edge of a stout knife so as to coincide in direction with the plane of cleavage, and striking the back of the knife sharply with a light hammer, very good cleavage forms may be got without injuring the surfaces already existing.

These false cleavages are sometimes, and more properly, called planes of union. They are formed when two or more crystals increase so as to come in contact. In such cases there is a sort of adhesion, but the compound mass breaks more readily between the crystals than elsewhere. As the broken surfaces so produced are often smooth and shining, they may be mistaken for true cleavages. They may, however, be easily distinguished, since with a true cleavage other lamellae may be readily split off parallel to the first one produced, but this is not so with false cleavages.

The cleavage of rock is frequently quite a distinct phenomena to that of minerals, but sometimes it is determined by the prevailing directions of the constituent minerals. Thus in mica schist the plates of mica have usually a prevailing direction, parallel to which the rock splits readily. In like manner, in many kinds of granite, the felspar crystals have a prevailing direction, which determines the "cleavages" of the mass.

The Ohmen Engine.

We give an engraving on this page of the "Ohmen high-speed engine." These engines are rated in power to run from 300 to 700 ft. of piston speed per minute with or without cut-off. They are made by W. H. Ohmen, of 109 Beale street, in this city, who claims for them economy and durability, and at a great reduction of former prices. In fact, he says he will guarantee his 10x12 engines to do as much work as any 12x24 engine on the market. The Myers' cut-off is used, when any is applied. The engines are made from 6x7 and 8 to 12-horse power to 12x12 and 35 to 80-horse power. The smallest size weighs 350 lbs., and the largest 3,500 lbs. The larger sizes can be furnished with disk crank instead of center crank, if desired.

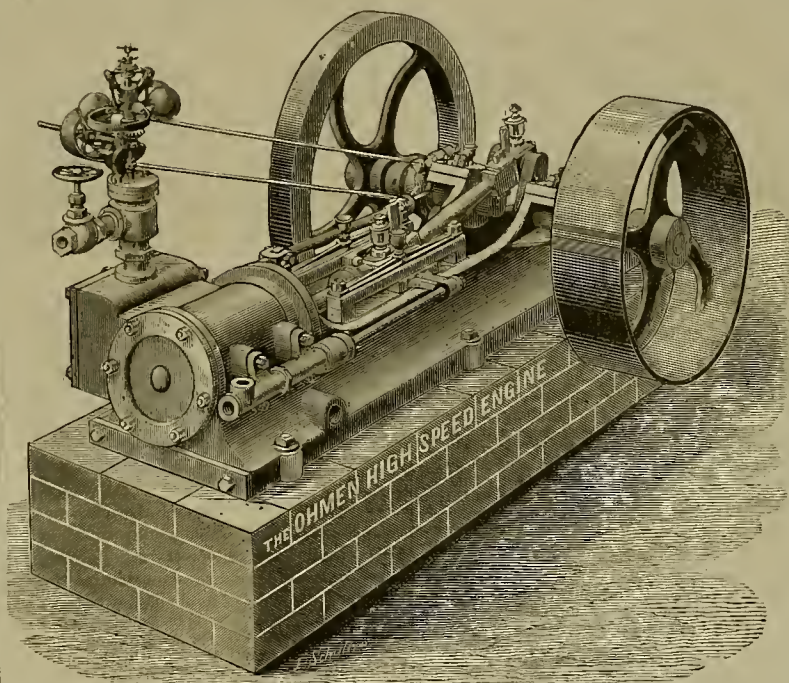
The Dutch Government will introduce in the Chambers a bill for the demonization of 25,000,000 florins in silver coinage.

The Davidson Wheel.

What are commonly known as hurdy-gurdy wheels are great favorites on this coast, more especially for running the hoisting derricks, so commonly seen in the mining region. We illustrate herewith one of this class of wheels, which was patented this month through the MINING AND SCIENTIFIC PRESS Patent Agency, by R. N. Davidson, of Weaverville,

central discharge turbine. The cut shows the front or discharge side, while the evolved dotted lines show the shape of the buckets coming to a point near the center, caused by the back side of the wheel being concave, thus bringing its apex near the plane of the front side. It also shows the nozzle of the hydraulic pipe near the lower edge of the wheel.

This wheel is well adapted for a country which is well supplied with small mountain streams;



Trinity county. He calls it the "Davidson Turbine or Hydraulic Water Wheel." He does not claim it to be far superior to all other wheels, under all circumstances, but has tried to supply a want long felt, namely: a cheap, simple, durable and easily-managed water wheel, that can

be adapted to all kinds of work on the farm, in the dairy, and the running of all manner of small machinery as well as the largest mills. There is no power as cheap as water power, or any which can compare favorably with it.

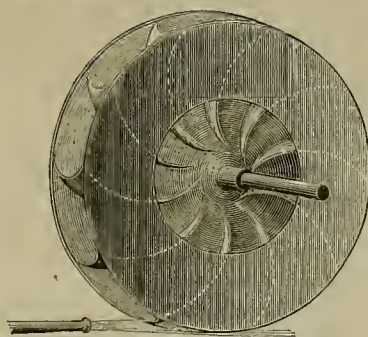
This wheel can be made of any required size, from a few inches in diameter, for running a sewing machine or churn, to four or five feet in diameter, for running the largest quartz and lumber mills. They are cast in one piece, without any bolts, slides or other loose parts to get out of order; no tight casing is required, nor is any heavy frame necessary to set them in; can be run horizontally or vertically; are easily moved from place to place, if desired; can be made to run either way; two or more can be put on the same shaft, or two or more nozzles can be turned on the same wheel, if more power is needed, or more water is to be used.

The wheel is constructed partly on the hurdy-gurdy order, but is more properly a hydraulic

even a fair spring at an elevation of 40 or 50 ft. can be made to do all the power work for a moderate farm, such as thrashing, pressing hay, cutting or grinding feed and apples, sawing wood and much other like work. As the power acquired is in proportion to the height of the head it will be seen that a small wheel with a small stream will give quite a large horsepower.

The wheels are well adapted to vertical shafts, and for a cold climate, as they can easily be kept free from water when not in use. They are more particularly adapted to a hilly country where the streams are small and have great fall, as a high head can there be obtained at small expense. For running of a hoisting derrick, so much in use in the mines of the Pacific Coast, from Mexico to Alaska, this wheel excels on account of its compact form and the ease with which it can be attached, as well as the great amount of power which it can certainly be relied on to furnish. Another great advantage is that the wheel cannot clog and will not be injured by muddy water.

WILLIAM MCGRIEVEY, an old rock foreman, known to railroad builders throughout the coast, was killed several days ago on the Northern Pacific at Weeksville.



THE DAVIDSON WATER-WHEEL.

Horses Underground.

It is not proposed here to speak of that style of geological horse which balks the hopes of expectant stockholders so often by coming into the ore body so inconveniently, but of the patient animals employed underground for hauling cars, etc. A short time since a gentleman named Mr. C. Hunting, spoke before the North of England Institute of Mining Engineers on colliery horses, and gave some facts concerning their feeding and management which are of interest. He stated that two things are necessary to produce condition in horses—hard work and high feeding. The former is never lacking in collieries, and the latter can easily be attained if cost be no object. A sufficiency of oats and hay, with plenty of work, will produce condition, but at a most extravagant cost; but high feeding can be economically attained, and horses may be kept in the highest condition at a cost very much below what is usually incurred for animals doing light work. There are three conditions which render high feeding economical: 1st. The selection of the cheapest but best food; 2d, giving that food in a form most favorable to digestion; 3d, the prevention of waste. The writer gave an analysis of the different qualities of food usually given to horses, and explained that several of these articles of provender possess very different qualifications; some are laxative, and some are constipative; but a judicious mixture can be made which will produce a most valuable food. The object of the larger portion of the paper is confined to showing what the mixture should be, and how it should be changed to suit the ever-varying prices of each of its ingredients without losing its nutritive qualities. Oats alone will not keep hard working horses in condition, nor can any single grain preserve both health and condition. He showed that musty or kiln-dried oats are dangerous. Oats should be sound, sweet, and a year old, and their natural weight should be at least 40 lb. per bushel. Maize is a most valuable article of provender for hard working horses. Cutting and bruising the hay are advocated; and the importance of the frequency and regularity of meals is shown. The writer quoted figures showing that at the principal collieries, etc., where his method of feeding is carried out, there was a saving of £41,114 13s. 4d. in the year 1881; the corporation of Newcastle saved £1,252 15s. in 1881. He also gave a statement of the saving effected over a number of years, varying from £117,455 saved in 31 years at South Hetton Colliery down to £4,227 saved by the corporation of Newcastle in four years; the total saving for 17 establishments amounting to £574,285. The saving in the cost of feeding by the writer's method is not by any means the only advantage or the whole economy effected; for it is claimed that horses do more work per annum, are in better condition and last considerably longer than those fed on any other plan. In the course of the discussion which followed the reading of the paper, Mr. Hunting condemned the use of condiments and spices and the cooking or boiling of food for horses.

It is stated that a contract has been let by the Central Pacific Railroad people to build 25 miles of the branch railroad from Berenda toward the Yosemite valley. The road will follow up the Chowchilla, and the division to be contracted for is to be completed by May 1st, in time to accommodate the Yosemite travel this season.

A New Amalgamator.

A. C. Bowen, of Michigan Bluff, Placer county, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency, what he calls a "disintegrator and amalgamator." The apparatus is supported on a framework. There is a horizontal driving shaft with fast and loose pulleys on the outer end and a bevel gear upon the inner end to engage a similar gear which is fixed to a vertical sleeve. Upon this sleeve-shaft is secured a horizontal wheel with slotted arms and upon one of these arms is a standard, between the upright of which a beveled pulley or roller revolves.

The pan is made with a curved concave interior, the outer portion of which is slightly depressed to form a channel for a ball to travel in. The pan is centrally supported by a ball and socket-joint so as to permit a universal motion around it; or an equivalent universal joint is made by means of a stem projecting downward from the center of the pan and flattened at the lower end. This end is forked and fits a similar loose fork upon the upper end of a vertical shaft below.

The outer part of the pan rests upon a beveled roller which is high enough to give the pan considerable inclination to one side, and as the horizontal wheel or disk is caused to rotate by the action of the bevel gear below, it carries the roller around beneath the rim of the pan, thus alternately lifting every portion of its periphery and giving it the rolling motion desired. The position of the roller beneath the pan may be changed, so as to increase or diminish the motion.

From the center of the pan a pointed shaft extends upward, and is connected by a link with an adjusting screw, extending upward to the top of the framework where it is operated by a nut or otherwise, so as to increase or diminish the meeting angle at the joint in the rod. The jointed rod keeps the pan in place during its movements and prevents its being upset during the rolling movement which is communicated to it by the roller beneath the edge of the pan. The material being then run into the pan while the latter is given its peculiar rocking or oscillating motion by means of the roller and wheel, the ball or balls will roll down the inclined or peripheral channel so as to remain at or near the lowest point, and the material, together with the mercury, which has been placed in the pan, will be thoroughly incorporated and amalgamated.

New Cut-off-Valve Gear.

Mr. Eugene O'Neill, chief draughtsman at the Union Iron Works, in this city has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency, a new form of cut-off-valve gear. Mr. O'Neill has made several important inventions in that line. The steam inlet valve and exhaust valve are operated by peculiar mechanism fully described in a patent issued to this inventor May 26, 1880, and the present invention is designed to provide a means for regulating the point at which the steam is to be cut off, and the speed of the engine governed.

The invention relates to an automatic cut-off for engines, which is operated by a governor or by air, water or steam pressure. It consists in the combination of a valve mechanism and valve tripping devices with a governor or with a cylinder within which a piston is moved to actuate the tripping arms by which the steam valves are released, so as to regulate their point of cutting off and the amount of steam which will be let into the cylinder at each stroke.

The eccentric by which the valves are opened and the one by which the cut-off is operated, are fixed to a shaft which extends parallel to the cylinder at one side, and is driven by a bevel gear from the main engine shaft. The cut-off mechanism consists of a rocker-arm, which is oscillated so as to trip the lever-arm at the proper time, and the change in the position fixes the time.

In his drawing, Mr. O'Neill shows a rock-shaft supported parallel with the cylinder and oscillated by means of an eccentric. Crank arms are fixed to it at each end, and these are united by a loose shaft, upon which other crank arms are fixed. The rocker arms are suitably connected with a movable sleeve upon the governor spindle, so as to be actuated by the movement of the governor; or they may be con-

nected with the piston of a small supplemental cylinder, which is operated either by the pressure of steam in the boiler which supplies the engine, or by the pressure of air from the receiver, into which air is being forced by the engine, or by the pressure of air from a receiver or an accumulator, which is supplied by the engine.

A weight is fixed upon an arm extending downward and outward diagonally from the shaft which forms the fulcrum of the lever. When the piston raises the lever and then turns the fulcrum, it will also raise the weight, and when the pressure upon the piston decreases, the weight acts to force the piston down and return the parts to their former position.

The weight prevents any sudden changes by its inertia, and its power increases as the piston is raised, because it is carried farther from a perpendicular. The lever has a handle by which it and the connected parts may be moved independently of the pressure cylinder or governor. A set-screw serves to clamp or hold the piston at any point, so that the governor may set the cut-off at any desired point independent of the automatic regulating device. Mr. O'Neill is, of course, aware that a piston running in a cylinder under the pressure of steam, air or water, and connected with the valve-tripping or cut-off mechanism of an engine by intermediate mechanism, is old. It is in the details of construction and operation that Mr. O'Neill claims his patent.

An Inventors' Institute.

The "Inventors' Institute of California" has been organized in this city. The officers are as follows: N. W. Spaulding, President; Daniel Buck, Secretary; First National Gold Bank, Treasurer; and A. B. Smith, Manager. The Directors are N. W. Spaulding, Columbus Waterhouse, E. P. Flint, Daniel E. Hayes and Ira P. Rankin. Perhaps the object can best be stated by quoting as follows from the circular:

The objects of the Institute are to sell and dispose of patent inventions of all kinds in this State and elsewhere, either in town, country, manufacturing or shop rights, or whole State rights, or the entire patent at one sale, or upon royalty, according to circumstances. The Institute making a specialty of selling and disposing of patents and patent rights, inventors and patentees can dispose of their inventions by and through the facilities afforded by the Institute, at greater profit and advantage than through private parties. Creditable and useful inventions will be placed before the public by advertising, circulars, agents, etc., so as to bring them to the notice of purchasers. Private parties will be sought out and solicited personally, or through correspondence, to buy particular inventions. Agencies will be established in the Eastern States and elsewhere, through which the Institute will be enabled to sell inventions expeditiously and profitably. Extensive correspondence will be carried on and solicited with parties interested in patent matters, and who use or manufacture special inventions, and every means will be employed by the Institute to extend its resources and influence so as to furnish the very best facilities to patentees and inventors for disposing of useful and meritorious inventions in this State and elsewhere, at profitable and satisfactory prices. The Institute will undertake the sale of inventions upon a commission from 15 to 25 per cent., payable out of the proceeds of sale. It will advertise the invention in a proper manner, and will endeavor, by all fair and honorable means, to obtain the best price therefor. Extra advertising can be agreed upon at reduced rates, and circulars prepared and printed as may be agreed upon.

The rooms of the Institute are located at 321 California street, and are commodious and central. In the exhibition rooms, connected with the Institute, models of inventions will be displayed, and explanations thereof will be cheerfully given to visitors and others. Inventors, patentees, and the general public, are cordially invited to visit the rooms at any time. Information respecting patents and matters relating thereto will be cheerfully given. Periodicals upon patent matters will be found at the room, and the library of the Institute will be available at all times to parties interested. Patrons of the Institute can have their letters sent to its care, and desks will be provided for their use under reasonable limitation.

If you wish only to exhibit your invention in our "exhibition rooms," you should send model and \$10, which will be the charge for space for one month, and thereafter the charges will be \$5 per month in advance. You will thereby have the privilege of explaining your invention yourself to parties interested, together with the assistance of the Institute in promoting its publicity.

THE BEAR RIVER COMPANY'S CLAIM.—In the case of the Bear River California Extension Placer Company's claim, the Commissioner of the General Land Office holds that placer claims upon surveyed lands must conform with public surveys in all cases, except where it is rendered impossible by previous appropriation or reservation of power of legislation. This particular placer lies within the bed of Bear river for some distance, and the opinion is expressed that it would be unwise public policy to impede the navigation or public usefulness of such rivers by the allowance of a claim of this character. The entry has been accordingly held for cancellation.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and foreign Patent Agency, the following are worthy of special mention:

THE WHEELED VEHICLE.—Wilmer T. Adel, San Jose, Cal. No. 271,294. Dated Jan. 30, 1883. This invention relates to the class of two wheeled vehicles, and to certain improvements therein, having for their object the prevention, as far as possible, of the unpleasant jerking motion which has always been the disadvantage of vehicles of this character. The invention consists of a novel spring connection between the shafts and whatever portion of the vehicle to which they may be attached; in a peculiar frame upon and from which the seat and footboard are supported, and in a cross spring supporting the front of the frame. It also consists of certain details of construction, such as dividing and hinging the seat to swing from the center, and the means for supporting it at the center.

WOOD TURNING LATHE.—Albion I. Sanborn, S. F. No. 271,368. Dated Jan. 30, 1883. The improvement consists of a horizontal bed, having a head and tail stock for holding the wood to be turned. The head and tail stock with the article to be turned are moved forward and back upon the frame and are rotated at the same time, so that the article will be subjected to the action of peculiarly constructed revolving cutters as it passes beneath them. In connection with this, the inventor employs a back rest with a cam and roller, by which the rest is made to follow the wood as it is reduced in size, and prevent shaking or trembling.

HORSE-POWER.—Edward A. Rix, San Francisco, Cal. No. 271,123. Dated January 23, 1883. This invention relates to certain improvements in horse-power machinery, in which a horse walking in a circle imparts motion to a drum, upon which a hoisting-cable is wound. It consists of an improved means for connecting the levers or sweeps to which the horse or horses are attached with the drum so as to drive it, and a means for disconnecting it from the sweeps, so that the drum will remain stationary, or may be revolved in either direction.

MINING CAR.—Gustav Ohlsen, assignor of part to Edward A. Rix, S. F., No. 270,689. Dated Jan. 16, 1883. The improvement in this ore car consists in a means for mounting the car body on the turn-table or track, by which the car, and especially its bottom, is relieved from the strain of the connecting bolt, and the weight of the ore within it will be supported by supplemental bars, which are secured beneath the bottom of the car, and through which the pivotal bolt passes.

VEHICLE BRAKE.—George R. Duval, Benecia, Cal. No. 271,047. Dated January 23, 1883. This invention relates to certain improvements in brake blocks for use upon vehicles and it consists in certain details of construction. The brake bar is properly supported and has connected with it the levers or mechanism by which it is moved to and from the wheels, and the brakes applied or removed. The brake blocks are fixed to the ends of the bar so as to stand in front of the wheels, and Mr. Duval's invention relates to an improved means of applying these blocks to the bar.

INCUBATOR.—John Peterson, Oakland, No. 271,355. Dated Jan. 30, 1883. This invention relates to certain improvements in incubators, and to a means for maintaining a regular and equable temperature; and it consists of a series of water-containing chambers so formed as to surround the receptacles for the eggs, and radiate heat upon the eggs from above.

STRAW BURNING BOILER.—Joseph Stevens, San Francisco, Cal. No. 271,148. Dated Jan. 23, 1883. This invention relates to certain improvements in steam boilers in which straw is employed as a fuel, and it consists in a peculiar construction of the device by which the straw is fed to the furnace.

RAILWAY CROSSING BARRIER OR GATE.—William B. Morris, San Francisco, Cal. No. 271,102. Dated January 23, 1883. This invention relates to a new and useful crossing barrier or gate for railway crossings. The object of this invention is to give notice at a point where unusual danger exists, and at the same time keep back those who might attempt to cross the track by placing an obstruction in the road.

FILTER.—James Miller, of Oakland, Cal., No. 271,098. Dated January 23, 1883. This invention relates to a new and useful water-filter, and it consists in the arrangement of vessels with relation to each other and their various divisions into compartments. By the special arrangement a superior filter is effected.

BOILER STRENGTH.—A boiler should be strong enough in every instance to sustain five times its working load before fracture to be quite safe, and allow for all the contingencies of ordinary service.

Copper Mining.

The Omega Copper Mining Company of Philadelphia have recently contracted with the Pacific Iron Works, Rankin, Brayton & Co., San Francisco, for one of their famous water jacket smelters to be erected at once upon their mine in the Helvetia district, near Tucson, Arizona. The Omega is a well-developed mine, and gives promise of being one of the most productive and valuable mines in that Territory. We feel assured that this company have made no mistake in the selection of their reduction works. The Pacific water jacket smelters, for both copper and galena ores, have been a most signal success in all parts of the country and with all classes of ores, and we know of no others that can be considered as anything more than an experiment.

In the interest of mining it may be said that no company can afford to purchase any machinery but that of established character and reputation. The Chicago branch of the Pacific Iron Works, recently established, have already, we understand, a large amount of mining work in hand destined to various localities. The establishment of these works is a much needed enterprise and a matter of genuine satisfaction to Eastern mining operators, who are thus enabled to avail themselves on this side of the continent of the practical experience and skill of this well-known firm, and we predict for them a large and constantly increasing trade. All parties contemplating the erection of any kind of mining, milling or smelting machinery would doubtless consult their interest by communicating with them.—*Philadelphia Mining Journal*.

THE Postoffice Department estimates a surplus of \$4,000,000 to \$5,000,000 the next fiscal year, if the two-cent letter postage is unauthorized. It is estimated that there will be little if any deficiency in consequence of the reduction of postage.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANES, State Mineralogist.]

[CATALOGUE.]

4467. Bird's Feather, coated with carbonate of lime—Formation Springs, Idaho. See No. 4468. Peter Decker.
4468. Atom Incrustation, found 10 miles north of Santa Rosa, Sonoma county, Cal. No. 4469. C. W. Frost.
4469. Copper ore, near Murphy's, Calaveras county, California. E. H. Schaeffle.
4470. Chromic Iron, near Murphy's Calaveras county, California. E. H. Schaeffle.
4471. White Lava—so-called—Indurated Volcanic Ash—near Murphy's, Calaveras county, Cal. E. H. Schaeffle.
4472. Sinterite—Near Murphy's, Calaveras county, Cal. E. H. Schaeffle.
4473. Sedimentary Deposit found in digging a well at a depth of 75 feet, near Reservoir station, Placer county, Cal. No. 4474. E. H. Schaeffle.
4474. Copper ore, practically Chalcopryite—Sections 12-13, township 15 north, range 6 east, Placer county, Cal. E. W. Roberts.
4475. Root resembling an owl's head—Found on the beach, San Francisco bay, near Martinez. T. Z. Davis.
4476. Silver ore showing wire silver—Belle of Butte mine.
4477. Copper Ore—Southern Utah. J. R. Seachman.
4478. Mica—New York & Dakota mining company, Custer county, Dakota, Ter.
4479. Section of Asphaltum Pavement, as laid in San Francisco, generally on a layer of soft brick. This specimen was laid on redwood boards. Composition—to 4 squares (400 square feet) 500 pounds of asphaltum, 1 ton of coarse gravel & 15 pebbles of coal tar from the g works, the whole heated 5 hours.
4480. Sandstone—Glenn Mills, San Mateo county, Cal.
4481. Canoeal Coal—West Virginia.
4482. Cellular Lava—50 miles from the Yaqui river, Sonora, Mexico. E. W. C. Morgan.
4483. White Dolomite—Armstrong Wash, San Bernardino county, Cal. This mineral is very common in the Inyo mountains. J. H. Colerich.
4484. Fossil Bone—Santa Cruz Island, Cal.
4485. Copper Ore, principally Chalcopryite Bullion district, Plumas county, Cal. Wm. E. Ward.
4486. Copper Ore, Oculocite—Entrance mine, Bullion district, Plumas county, Cal. W. E. Ward.
4487. Impressions of fossil leaves in shale, overlying coal or lignite—East of the base of Mount Hamilton, Santa Clara county, Cal. J. R. Seachman.
4488. Rock specimen, silicious, but probably changed from pisolite; an interesting specimen which should be carefully studied—Caucasian, Grant county, Oregon. F. Harvey M. D.
4489. Bog Iron Ore showing vegetable structure—Lava district, near Lost river, Idaho. A. E. Roberts.
4490. Tuff in Bog Iron Ore—Lava district, near Lost river, Idaho. This tuff, being in bedded, seems to prove that the iron ore was at one time plastic. Presented by A. E. Roberts.
4491. Gold in Quartz, cut and polished specimen—Diadem quartz mine, Edman district, Plumas county, Cal. J. A. Edman.
4492. Galena—Muldoo mine, Little Wood river, Alturas county, Idaho. A. E. Roberts.
4493. Lead bullion from Muldoo mine, Little Wood river, Alturas county, Idaho. See No. 4492. A. E. Roberts.
4494. Slag from lead furnace—Muldoo mine, Little Wood river, Alturas county, Idaho. See No. 4492. A. E. Roberts.
4495. Furnace product Muldoo furnace—Little Wood river, Alturas county, Idaho. See No. 4492. A. E. Roberts.
4496. Molybdenite—Vancouver Island, British Columbia. H. Green.
4497. Quartz crystal with included rutile—San Jacinto mining district, Humboldt county, Nev. W. D. Linton.
4498. Lithomane—Lassen county, Cal.
4499. Volcanic Ash—Chalk Bluffs, Nevada county, Cal. near Willow street, Alameda county, Cal. Dr. S. G. George.
4500. Clay from an artesian well 93 ft. deep—San Antonio, Thonito—Quero, Piedmont, Italy.
4501. Dolomite with garnet and clinoclase—Piedmont, Italy.
4502. Dolomite with pyrite on quartz—Traversella, Piedmont, Italy.
4503. Sulphur Crystals—Sicily, Italy.
4504. Calcite Crystals—Traversella, Piedmont, Italy.
4505. Dolomite with pyrite on quartz—Traversella, Piedmont, Italy.
4506. Mangano-calcite on Calcite—Valley of Ala, Piedmont, Italy.
4507. Selenite—Piedmont, Italy.
4508. Orthoclase—Near Lake Maggiore, Italy.
4509. Siderite—Lenticular Crystals—Traversella, Piedmont, Italy.
4510. Siderite Crystals on Magnetite—Traversella, Piedmont, Italy.
4511. Garnets—Traversella, Piedmont, Italy.
4512. Greenovite—Manganiferous Titanite—St. Marcel, Val D'Aosta, Piedmont, Italy.
4513. Barite—Piedmont, Italy.
4514. Dolomite Crystals—Piedmont, Italy.
4515. Epidote with Quartz Crystals—Traversella, Piedmont, Italy.
4516. Mica Crystals—Traversella, Piedmont, Italy.
4517. Epidote Crystals—Valley of Ala, Piedmont, Italy.
4518. Chloritoid—St. Marcel, Valley D'Aosta, Piedmont, Italy.
4519. Magnetite Crystals—Traversella, Piedmont, Italy.
4520. Anglesite Crystals on Calcite—Traversella, Piedmont, Italy.
4521. Dolomite Crystals with Calcite—Traversella, Piedmont, Italy.
4522. Clinoclase Crystals—Piedmont, Italy.
4523. Violan—a variety of Pyroxene—St. Marcel, Val D'Aosta, Piedmont, Italy.

MECHANICAL PROGRESS.

Sawing Hard Steel With Sand.

The practice of mechanics is largely a series of experiments, some successive and cumulative and others isolated and independent. Some months ago a mechanic wished to cut some very narrow slots in a bar of steel that was hammer-hardened, and it was desirable that it should not be annealed and rehardened, because of the danger of disturbing the relative widths of the slots. The workman tried the ordinary saw, or thin rotary milling tool, but found it to be impossible to keep an edge. After many ineffective trials, he recollected having witnessed the sawing of stone with sand urged by sheet iron blades. He substituted a soft iron disk for his steel saw, and, procuring some molding sand, he had the satisfaction of seeing progress made in the obdurate steel. By changing the molding sand for fine quartz sand and using a disk of Muntz sheathing metal, feeding the sand with water, he performed the job in a most satisfactory manner.

Since that time he has experimented with disks of lead and antimony, of copper, plate brass (rolled), sheet iron, and the Muntz metal. He gives the preference to the latter, and has succeeded, by using three thicknesses of the metal, to cut a wide "kef" in slotting more than one-quarter of an inch wide. In a width of these dimension he prefers to score the edge of the disk so that one portion of the cut will be recessed while the other is advanced. The speed must be necessarily moderate—about that of turning iron in the lathe—or the sand and water would be thrown out of the cut before they could do their work.

The quality of the work varies, of course, with that of the cutting material employed, emery and oil not being used advantageously because of their cutting the saw faster than they do the more obdurate material. Quartz sand of various degrees of fineness appears to give the best results, and it seems to be necessary that the disk should be softer than the material to be cut. It is understood, of course, that the disks are not serrated like a circular saw, but are smooth on the edge. Indeed, their action appears to be precisely like that of the toothless blades used in sawing blocks of marble and other stones; they merely push the cutting sand against the material, or perhaps to a certain extent receive and temporarily hold it embedded in their softer material.—*Scientific American*.

THE CIRCULAR SAW CONDEMNED.—In the last report of the French Society for Preventing Accidents from Machines—a society founded under the auspices of the Société Industrielle de Mulhouse—a recommendation is made for the avoidance of the use of circular saws in all workshops where practicable. The following are the reasons for this recommendation: 1. Circular saws are dangerous to workmen. 2. They require more power than other saws. 3. They cut a broader line, and are consequently more wasteful. All of which is doubtless true, but we incline to the opinion that the circular saw will long hold its own, on account of its great convenience. The maul and circular saws are both American tools. The pit and gang gate saws are English, and the single sash saw is of Dutch origin. Up to 1849 very few circular saws were larger than 48 inches in diameter, and none were more than 54 inches, while even 36-inch saws were considered very large and very rarely used. In that year the first saws 60 inches in diameter were brought out, but only two were made during that year.

NEW JOURNAL BEARING.—A recent improvement in linings for journal boxes for car axles, and other purposes, of which Mr. Ferdinand E. Canda, of 52 William street, New York, is the author, consists in taking advantage of the well-known unguentous or anti-friction qualities of mercury. He makes an amalgam of tin in which any of the well-known metals or alloys used for bearings are employed as constituents with mercury.

While the mass is in a plastic state it is subjected to pressure to expel the superfluous quicksilver, and then allowed to harden; the journal box is then ready for use. Plumbago or other suitable anti-friction substances may also be introduced into amalgam if desired. It has been found by experiment that this new journal box metal has superior qualities as an anti-friction substance, and it promises to form an economical, durable, and most useful material for railway axles, and bearings of every description.

PROSPERITY IN MACHINE SHOPS.—The *American Machinist* prints letters from over 40 establishments engaged in manufacturing machinery, engines, boilers, tools and machinists' supplies, representing several States, which tend to show that 1882 was a signally prosperous year, and that confidence in trade for the present year is not lacking. Taken as a whole, however, prices of machinery and tools are lower than they were last January, and the tendency is toward closer competition. Iron and other materials that enter into machine construction are lower than in January, 1882, but as a rule wages of first-class mechanics have not declined.

A NOVEL TRAM CAR ARRANGEMENT.—At a Bavarian exhibition in Nurnberg lately there was shown from Noell's wagon manufactory at Wurzburg, a tram car which does not require switch and siding on meeting another car. The car is kept on the rails by means of a fifth wheel in front of the others, and catching in a groove between the rails. The guide wheel is set in a triangular frame on the fore axle, and when the driver raises this the car readily leaves the rails, and may be drawn over the street pavement in any direction. Such cars have been successfully used in Hamburg and Lisbon. Of course, the leaving the rails involves greater strain for the horses, but this is only temporary and without serious inconvenience.

ECONOMY IN COAL. The *American Machinist* says that one of the means of reducing the consumption of coal under or in a steam boiler, is the keeping of a complete daily record of the amount burned. This does not imply that the saving is made by providing a check on the fireman, but rather that it enables him to gauge different manipulations by the exact results; in others, it affords him a reference in educating himself in his duties. Notwithstanding the expense of providing for weighing and recording the coal burned each day is merely nominal, and will not fail in saving ten times the expense in the majority of instances, it is not done.

TO PRESERVE WIRE ROPE.—The *Scientific American* says that to preserve wire rope against wet and rust and keep it pliable apply raw linseed oil with a piece of sheepskin, wool inside; or mix the oil with equal parts of Spanish brown and lamp black. To preserve wire rope under water or under ground, take mineral or vegetable tar, add one bushel of fresh slaked lime to one barrel of tar, which will neutralize the acid; boil it well, then saturate the rope with boiling tar.

A NEW COMPOSITE PULLEY.—A patent has recently been issued for a composite pulley, formed of a cast-iron hub, a web or body made of paper, pasted and pressed into a solid block of the thickness to give it the required strength, and this web surrounded by a wrought or cast rim secured to the web by means of knees or flanges riveted through the rim and the paper. The claim is made that the rim, having a uniform bearing upon the paper body, is steeper and more even than any iron pulley yet made.

AMERICAN MACHINERY FROM ENGLISH WORKSHOPS.—The latest and most important imitation of American machinery by the English is that of the American locomotive. A prominent firm at Newcastle-on-Tyne has already shipped two engines of the American type to Newfoundland, for use upon a new railway just opened there, and a third is now being finished for the same destination.

By the use of hollow steel shafting, which is now generally introduced in Europe, even for such heavy work as steamship propeller shafts, the weight is very much lessened in proportion to the decreased strength. A 10-inch shaft with a hole four inches in diameter, has its weight reduced 16%, with a loss of only 2.56% of strength. A five-inch hole would make the figures 25 and 4.25.

PAPER CAR WHEELS.—Over 30,000 paper car wheels were in service in this country on the first of January last, with a report of only three failures during the year, neither of which caused any serious injury or harmed a single passenger. They are in use on over 150 different roads, and their record, thus far, it is claimed, is unsurpassed by any other make of wheel.

AMERICAN WOOD WORKING MACHINERY.—The superiority of American made wood-working machinery is everywhere acknowledged. The constantly increasing export trade of our leading manufacturers abundantly proves this. The exportation of our wood-working machines, is destined to assume enormous proportions, and those manufacturers who take early steps to secure this trade will reap a rich reward.

FRENCH BAND SAW BLADES. of which great numbers have been sold in this country, are gradually giving way to home-made blades. Our saw makers can now produce as good blades as can be found in the world. As to the band-sawing machine itself, foreign makers cannot approach the American machines.—*The Wood Worker*.

INCREASED USE FOR ALUMINUM.—Now that aluminum can be produced cheaply we will soon find it coming largely into use to replace the heavy iron work of yachts. It is very light and does not corrode. It will even be possible to sheathe a yacht with it. No more galvanized work.

RAILWAY FIRE SERVICE.—The numerous fires which have recently occurred upon railway trains have brought out a railway fire service which may be attached to any locomotive. It is described as a very simple apparatus readily attached and put to work.

Two 90-ft. lathes, said to be the largest in the world, have been made by the South Boston Iron Works. Each lathe contains 600,000 pounds of iron. They are to be used to bore out cannon.

SCIENTIFIC PROGRESS.

Science in Soap Bubbles.

The soap bubble has now come within the reach of science. By means of those gauzy globes many beautiful and interesting experiments have been made at the Franklin Institute during a lecture by Mr. D. S. Holman, actuary of the Institute, on "Some Effects of Light and Sound." The instruments used were the Holman lantern microscope and the same gentleman's later invention, the phonoscope, which may be freely translated into "seeing sound." The former instrument consists of a metal box containing an oxy-hydrogen light, which is thrown at any angle by condensing lenses upon the object to be magnified. This light is reflected off at another angle through the magnifying lens on a screen, where the object is displayed greatly magnified.

The phonoscope consists of a thin metal tube, on one end of which is a thin cap in which a hole one inch square is cut, and at the other end is a large mouthpiece, such as are used on speaking tubes. The soap-bubble preparation is composed of oleate of soda and glycerine, and from it bubbles two feet in diameter and of exceeding brilliancy can be blown. Some of these have been kept 48 hours under glass. The lecturer dipped the small end of the phonoscope into a saucer filled with this preparation, which left a film across the square opening. The cone of light from the lantern was then thrown upon the film and reflected upon a screen through the magnifying lens, making a figure about two feet square.

The effect was beautiful. At first nothing but a gray surface was seen, then gleams of color appeared, and in a moment the whole square was a mass of dazzling brilliancy which would have put to shame any kaleidoscope ever made. Every instant the beautiful picture changed; now a wonderful design in reds and yellows, looking like a tea store chromo of an Italian sunset; then shifting to a swarm of peacocks' tails, or a pantomime transformation scene struck by lightning and as suddenly changing to a sombre view in blue and purple, or a rainbow dancing a waltz. After showing several of these pictures, the lecturer proceeded to show the effects of sound upon the soap-bubble. A couplet was sung into a phonograph, the mouthpiece of which was placed against the mouthpiece of the phonoscope, and the crank was turned. As the sound issued forth, a curious effect was produced upon the picture. Geometrical figures in black appeared upon it, small and distinct when the notes were high, large and less clearly cut when the notes were low. Around and among the black figures whirled the ever changing colors, red, blue, green, yellow, in all their varying shades, melting into one another too quickly for their blending to be followed by the eye. Human voices also sang to the soap-bubble, and with equally curious results. It is proposed to exhibit this experiment on a very large scale as soon as the new lantern microscope, now being made for the institution, is finished.—*Philadelphia Record*.

HUNGER AND APPETITE.—Dr. Fournie, the French physiologist, distinguishes between hunger and appetite by describing the former as a general desire for food, no matter of what kind, while appetite is the feeling of pleasure which results from the gratification of that desire. This is proved by the fact that often, when we are not hungry, appetite comes while we are eating, or at the mere sight and smell of some favorite dish. The question as to where the seat of the feeling of hunger is, has been much discussed by physiologists. Leven asserts that it is not known at all, while Longet and Schiff believe that it is diffused through the whole body; but this latter view is disproved by the fact that in some diseases people waste away without ever having the slightest feeling of hunger. Dr. Fournie's theory is this: When meal-time arrives the glands of the stomach become filled and distended, and ready to accomplish their function of digesting the food. But if food is not introduced, they remain in this distended condition, and the result is the uneasy feeling we call hunger. Excellent proof of this theory is afforded by the habit of some Indians of eating clay to appease hunger. The introduction of the clay is followed by the discharge of the glands, and the sensation of hunger is arrested.

A HEAVY BRAIN.—It is well known that, although many distinguished men have had very large brains, these have been occasionally equalled by the brains of persons who never displayed remarkable intellect. Another illustration of this has been lately published in the *Cincinnati Lancet*, by Dr. Halderman, of Columbus. A mulatto named Washington Napper, aged 45 years, recently died in the hospital at that town, in consequence of paralytic infection due to an abscess of the thigh. His brain was found to weigh 68½ ounces, nearly 5 ounces more than the famous brain of Cavier. His height was six feet; his limbs are said to have been ape-like in length, his head was massive, lips thick, lower jaw prominent, but his forehead large and well developed. He had been a slave until the year 1862, and had never been regarded as particularly intelligent. He was illiterate, but is said to have been reserved, meditative and economical.

The Scientific Argument for Theism.

Whatever may be said against science and scientific men, as being, in the opinion of some good Christian people, hostile to the doctrines of Christianity, certain facts have been adduced as the result of scientific investigation that lead directly and logically to a faith in a Supreme Being. There was a time, so science teaches, when the earth was a molten mass, a globe of incandescent matter, upon which, or near which, life was an impossibility. There are, doubtless, some germs that are hard to kill; but in such a heat nothing great or small could retain for an instant the least vitality. How, then, was life introduced upon this planet? This question may be asked independently of all ideas or theories in regard to evolution. Life may have begun with a germ so infinitesimal and simple that protoplasm would be a gigantic compound in comparison, and yet the answer would necessitate the admission that some creative agent more potent than matter has been at work. The answer, to be at all satisfactory, necessitates, in short, the existence of a spiritual, intelligent force. Science leads us up to this. There is no escape from this conclusion. It matters not whether we call this force by one name or another; in the last analysis it is God, the Supreme Being, who is the great spiritual force that has always been recognized in some way by human beings from the earliest historic period to the present time. Because we cannot understand how a spirit can act on matter, there is no valid scientific objection in the way of our acceptance of the fact. There are a great many facts which science accepts which it cannot explain. The only question is, does the evidence require that we should accept it? Here are phenomena that nothing we know of in nature can explain, and which, furthermore, are inexplicable on any other than the spiritual hypothesis. Scientific men are therefore called upon to admit the existence of such a spiritual force in nature, that began to act in the production of living things some time after the earth became, by cooling, a fit abode for them. D. L. PECK.

Still Another New Gas.

Mr. Love, in the *Sanitary Engineer*, gives an account of the purpose of a new gas company recently organized in New York with a capital of \$2,000,000.

The company holds three patents issued in 1880. These patents are similar in most particulars, and relate to a process for producing hydrogen gas. It is proposed to decompose, by means of highly heated caustic lime, a mixture of steam and naphtha vapor, or other gaseous substance containing carbon. The mixture of steam and naphtha vapor is first passed through a superheater, after which it enters the converting furnace. This consists of an inverted V-shaped chamber, which is filled with caustic lime through the opening at the top. The patent states that the "furnace is made in two parts, with the object of having one portion cooler than the other."

The contents of this chamber must be heated to a high temperature by gas from a separate generator. This done, the mixture of steam and naphtha vapor is allowed to enter at one end, which is supposed to be the hotter part, and, passing through the lime in the first arm of the chamber, is decomposed with the formation of hydrogen and carbonic acid. "This carbonic acid is subsequently taken up by the lime in the cooler portion of the double furnace, the lime in the first portion being too hot to enter into combination with carbonic acid and form carbonate of lime."

When the temperature of the lime becomes so low that the decomposition is not effected, the flow of steam and naphtha is diverted into another similar furnace, the carbonate of lime in the chamber is rendered caustic again by contact with combustible gases from the separate generator. In this way the process is intended to be continuous—the same lime acting over and over again without removal from the chamber. Indeed, the patent states as the most important improvement of the process the reconversion of the carbonate of lime into lime. It is also claimed that "heated brick or other similar substance" will not take the place of the lime in the decomposition of the gaseous mixture. With lime the resulting products are hydrogen and carbonic acid, while with the other material hydrogen and carbonic oxide would be produced.

HOW TO STOP THE SULPHURIC ACID.—*Knowledge* says that Dr. Jule has been experimenting, with a view to counteracting the bad effects produced by the sulphuric acid, which the combustion of ordinary illuminating gas causes in sufficient quantities to destroy the binding of hooks and to tarnish the lettering on their backs, besides, of course, vitiating the atmosphere so much that the health of the person breathing it is injured. He suspended two plates of finely perforated zinc, one three and the other twelve inches above the burner. At the end of three months the lower plate showed an accumulation of the ordinary brownish-black deposit and a furring of sulphate of zinc, but the upper plate was only slightly affected. The inference from this examination is that a single plate of perforated zinc, about a foot square, placed over a gas jet is sufficient to retain most of the noxious emanations.

those of the Banderita, it was allowed to fall into the hands of procrastinating until there are but few left to certify to its early history or merits.

NEVADA.
Mining Matters.—Grass Valley *Chronicle*, Feb. 16: "There is the expectation that there will be more activity in quartz mining in this district the coming summer than there was reason to expect a few months ago. Some of the prospecting mines which have suspended during the winter months will resume operations, while there are rumors, for which there is some basis, of one or more old mines starting up. There are also several bonding operations of good properties being in course of negotiation with a view of putting them into new and stronger hands, so that it may be said that there is not idleness or indifference as to the opening or development of the quartz resources of the district. There is no field in all California that offers more encouragement for legitimate quartz mining than this. This character of mining has been a successful business here for more than thirty years, during which time many millions of dollars have been extracted, and yet there are many veins that are not fairly prospected on the surface, and a number of properties that have only been superficially worked to the depth of 100 to 300 ft. There is a wealth in the quartz veins of the district that justifies the outlay of a large capital and the efforts and labor of enterprising men. Although much work has been done in the way of exploitation it is merely the beginning of what is yet to be accomplished in this old and reliable gold-bearing region."

ELIOTON FOR JANUARY.—*Transcript*, Feb. 10: Gold bullion to the amount of \$84,000 was shipped to San Francisco last month by mines in this locality through Wells, Fargo & Co.'s express. The shipments for January, 1882, did not equal this amount by about \$20,000.

PLUMAS.—**TAYLOR-PLUMAS MINE.**—*Greenville Bulletin*, Feb. 7: About 30 tons of ore were crushed in the new mill, and from this a partial clean-up was made of bullion to the amount of \$700; the ore crushed was a miscellaneous mixture, taken from all parts of the mine, some from the main tunnel, some from an upper level, and more from the new winze, the purpose being to get near an average of the ore from the mine. It is very tantalizing to have the water fail just when all is ready for going ahead with such an encouraging prospect, but the hard frost and cold clear weather still continues and there is no help for it. In the mine the winze is now down about 50 ft, the many stringers have all run into the main ledge, which is now about 5 ft wide, and looks very well.

SAN BERNARDINO.
SILVER KING.—*Calico Print*, Feb. 3: Work is still progressing in this mine, all the tunnels and drifts having men at work in them. The ore bin at the foot of the large chute, which holds 100 tons of ore, is about full. The road leading to the bin is about finished, and in a few days teams will be hauling the ore to the Oro Grande mill. There have been several good strikes made in the mine lately. The ore taken out now is considerably better than that taken out last summer.

SILVER OBESIA.—This mine has the best external appearance of any in the camp. There is enough ore in sight to reimburse the owners for amount of the purchase money. The car track, chute and bin are about completed, and eight men are at work taking out ore. The mine was surveyed the other day and an application for a patent to the same will soon be made.

SAM HOUSTON, No. 3.—This mine still sustains its excellent reputation. Work is still progressing in the same. Last Monday a vein 28 inches thick was struck bearing rich ore, mostly black metal. In a few days Mr. Johnson will ship to S. B. Holden, of San Francisco, four tons of ore that will assay \$2,000 to the ton. Ten tons of second class ore has just been milled at Sherman's mill that yielded \$202.55 to the ton.

SUE.—Messrs. Sam James and Nels Wager have leased the Sue mine, situated above the falls in Wall Street canyon, and are at work developing the same. They are running a cut into the ledge, which is a strong one, containing spar, and from which they have taken some very rich ore. We saw some specimens that assayed as high as \$7,000 per ton. They claim that there is a large body of ore there that will yield away up in the hundreds.

ANOTHER SALE.—Charles Morris and Richard Wiseman, who owned a third interest, each, in the Dragon No. 1, have sold their interests in the same to Wm. Raymond, getting a good price. They will now put men to work on the road and complete the same to their other mines, thus enabling them to develop the same with much greater ease than heretofore.

SHASTA.
FRENCH GULCH.—*Cor. Redding Independent*, Feb. 9: The quartz mines are all in a progressive way—rolling out tons of ore. Mr. Shafter has recently intersected a lode in a long and deep tunnel he has been driving, at a depth of 250 ft, that will make one's palms itch and mouth water. There is a sale of mining property in progress in this neighborhood to parties resident for good-sized figures. The Gibson Bros. are raising the working force in the mine on Deadwood. Work is going on in the New Brunswick claim, the dry winter being very good for prospectors.

SIERRA.
SCALES DIGGINGS.—*Cor. Sierra Co. Tribune*, Feb. 7: In the mine but little work has been accomplished owing to the cold and freezing weather. The Cleveland company have been working half days for the past three weeks. A slide of bedrock occurred at the mine to-day which completely blocked the mouth of their new shaft. However, Supt. Bean says the accident will only occasion one day's delay. The Fairplay and Union Hill companies commenced washing to-day, but if the cold weather continues they will soon close down again. The Poverty Hill Co. are washing. Two men of this place have been running ahead the tunnel at the Lucky Hill company's claim for the past three weeks.

SHUT DOWN.—*Nevada Transcript*, Feb. 9: A report reaches here that work has been suspended at the Marguerite mine near Sierra City for the following reasons: Two of the Bostonians heavily interested in the property recently came out and upon their arrival instructed Supt. Deidesheimer to reduce the scale of wages. This he said he could not do,

whereupon they would make a start by cutting down his pay. He immediately resigned, and the men working in the mine followed suit as soon as they heard what was going on. It is stated that an effort will be made to get miners in this locality to go up and take the places of those who quit. The Marguerite has been splendidly managed from the start, and in addition to paying off the indebtedness \$49,000, we believe incurred in starting it, has yielded large dividends to the stockholders. It will be unfortunate indeed if any mistakes are made now that may interfere with its future prosperity.

TUOLUMNE.
LEASED.—*Tuolumne Independent*, Feb. 7: The Kincaid Flat Mining Co. has relinquished to Michael White the exclusive privilege of prospecting and working the property of the Company, for the term of four years, from and after the 1st day of January, 1883. White to have the privilege of using any timber growing upon the ground, for his mining purposes, and to have the privilege of removing any improvements he may put upon the ground, and to have three-fourths of the gross proceeds of his labor, and he is not to interfere with any gravel claim upon the ground. White is to send to the representatives of the Company, by express, to San Francisco, all the gold he may take out of the claim, and they are to return to him the three-fourths of gold to which he shall be entitled.

Nevada.
WASHOE DISTRICT.

UNION CON.—On the 2000 level the east crosscut joint with the Sierra Nevada is being pushed forward at the rate of about 20 ft per week in a favorable vein formation. It has yet a considerable distance to go to reach a point where ore can be looked for. The east crosscut on the 2000 level, joint with Mexican, is in a formation that shows many promising feeders of quartz. The pumps in the Union shaft will be started up on Tuesday. The ground both on the 2700 and 2900 levels is now pretty well drained out, and in crosscutting there will be but little trouble with water.

SIERRA NEVADA.—The north lateral drift on the 2900 level is being advanced at the rate of about 20 ft per week in a favorable formation. The east crosscut on the 2900 level, joint with the Union Con., is also being driven ahead at the rate of about 20 ft per week. It is in vein material that shows some quartz.

MEXICAN.—The joint Union Con. east crosscut is still being advanced in a formation that contains many stringers and feeders of quartz. At the joint Ophi winze guides are being put in for a second line of cages. These cages will be in operation the first of next week, when a crosscut will be started east from the station at the 3100 level. The new pumps at the Union shaft will be running next Tuesday, when crosscuts may be started at several points on the 2700 and 2900 levels. These levels are now pretty well drained out.

HALE & NORCROSS.—The main north drift on the 2600 level, joint with Savage, is being advanced at the rate of about 40 ft per week. It is passing through a favorable vein formation that contains numerous feeders of quartz that give good assays.

OHIER.—Guides are being put into a second compartment of the joint Mexican winze from the 2900 down to the 3100 level. This work will be completed and the cages running the first of next week, when a crosscut will be started east from the station at the 3100 level.

NORTH GOLD & CURRY.—Sinking the shaft is making rapid progress. The material encountered continues to be vein porphyry, with frequent stringers of quartz and seams of clay.

UNION SHAFT.—The new pumps will be in and running by Monday or Tuesday, when crosscutting may be commenced at several points in the Mexican and Union Con. mines without fear of trouble from water.

SAVAGE.—The north drift on the 2600 level, joint with the Hale & Norcross, is being advanced at the rate of about 40 ft per week. It is in ground that carries many feeders of quartz that gives good assays.

ALTA.—The drain drift to connect with the south branch of the Suro tunnel is being pushed forward very rapidly. The completion of this work will double the capacity of the Alta pumping machinery.

GOLD & CURRY.—On the 2500 level the west crosscut is being pushed forward through vein porphyry, in which are beginning to be seen frequent seams of clay and quartz.

YELLOW JACKET.—The old upper levels continue to yield a considerable amount of good milling ore. A considerable amount of work in the way of prospecting is being done.

CALIFORNIA.—Good progress is making in the main south lateral drift on the 2900 level. The ground passed through is the usual vein porphyry.

SCORPION.—The east drift on the 500 level is still being pushed across the vein. As yet no sign of the east wall has been found.

POTOST.—The ground through which the main south drift on the 2600 level is passing continues to be dry and favorable.

ANDES.—The drifts are showing a considerable amount of quartz, with occasional bunches of low-grade ore.

CROWN POINT.—Are still extracting a considerable amount of low-grade ore from the old upper levels.

COLUMBUS DISTRICT.

NORTHERN BELLE.—*True Fissure*, Feb. 10: The contemplated drift from the bottom of the winze from the fifth shaft level, has been started and has reached a depth of 14 ft. Crosscutting from this drift will soon be commenced toward the footwall of the ledge. Crosscut No. 2, on the fifth shaft level, has been advanced 13 ft, being in the same formation as at the time of the last report; its total length is 46 ft. Stopping a nice vein of sulphuret ore, about a foot in width, still continues above the fifth shaft level. The ore in the stope above the fourth shaft level has improved materially, being about 2 ft in width, of fine yellow chloride, with every indication of widening as the work on it progresses. The daily yield of ore is about 67 tons, which mill No. 2 continues to handle well. The total amount of bullion shipped during January was \$80,197.29, with \$17,207.37 on account of the current month.

MOUNT DIABLO.—The stope above the drift connecting winzes Nos. 1 and 2 shows about a foot of \$70 ore. Some \$60 ore is being stoped from a wide ledge of low grade ore in winze No. 1, below the

third level. Winze No. 2 shows 18 inches of ore assaying \$100 per ton. The stope near the head of winze No. 2 on the third level, is turning out considerable \$80 ore, while winze No. 4 is yielding some ore of a value of \$90 per ton, from narrow streaks found at that point. The stope above this winze, between the second and third levels, has 18 inches of \$75 ore at its eastern end. The appearance in the stope above the west drift, on the third level, is good and is showing a foot of \$75 ore at its eastern end. The intermediate stope above winze No. 1 has developed from 8 to 10 inches of \$200 chloride ore. A small amount of \$75 ore is being taken from the stope on the second level nearly north of the shaft. A wide ledge formation has been encountered in the stope above the west drift from the Callison winze, containing streaks of \$90 ore.

ESMERALDA DISTRICT.
THE CORTIZ MINE.—*Esmeralda Herald*. We are informed that the stopes of the Cortez are looking exceedingly fine. Yesterday work was being carried on in five of them, every one of which was producing good milling ore. A new body of very rich ore was struck a few days ago. The vein, though small when found, has gradually widened until it is now about 18 inches wide. Who knows but what this will lead into one of those large and rich chambers so common on Silver Hill in '63. Hope it will. The Cortez never looked so well since work was commenced on it as it does now.

OSCEOLA DISTRICT.
REMOVED SALE.—*Ward Reflex*, Feb. 3: There is a rumor afloat that the Monroe and Linton mines in Osceola have been sold. The purchase price is not given.

TAYLOR DISTRICT.
FIDDLE.—*Ward Reflex*, Feb. 6: A number of mines in Taylor district were virtually sold last week for \$50,000, but it was "busted out slick and clean" by the man who had worked the hardest to bring it to a head. Everything was perfectly satisfactory until after the papers were made out, and then he said he didn't want to sell, and this after inducing the purchaser to come all the way from Ohio. Child's play of this character is well calculated to damage any district, no matter how bright its prospects may be.

WATER.—*Ward Reflex*, Feb. 3: We are reliably informed that water enough has been struck in Taylor district to supply that camp.

Arizona.

RICH ORE.—*Citizen*, Feb. 11: Mr. J. W. Canada arrived from the Santo Domingo district yesterday with samples of ore from the Excelsior, Hilo Verde and Turner mines. The mines are owned by the Oriole Co. of Baltimore, of which Col. L. A. Smith is superintendent. The Excelsior has a 4-ft ledge that at the depth of 100 ft assays on the average \$227 per ton. The ledge matter of the Hilo Verde at the depth of 65 ft is but 18 inches wide, but it carries a three-inch streak that assays away up into the thousands. The Turner mine in a 10-ft shaft shows a strong ledge of 4 1/2 ft, enriched throughout with black petanque. The Hilo Verde is especially rich, the ore streak mentioned is pure native silver. Three and a half tons of it have been shipped, and will, in the course of a few days, arrive here en route to headquarters at Baltimore. Another and larger shipment will follow soon. The mines are located about 22 miles south of the Gunsight. Some 40 men have been employed by the company who propose shortly to begin development on a much larger scale. If the ore shown by Mr. Canada yesterday be a criterion to judge by, Santo Domingo district must soon become famous for the great wealth of its ores.

GROOM CREEK.—*Prescott Courier*, Feb. 9: We learn that Mr. Riotte, the eminent mining engineer, who recently visited Groom Creek in the employ of the Arizona Queen M. Co., has submitted his report of inspection to the officers of that company. His examination did not extend beyond the Chicago, the principal mine of the group, owned by this company. He speaks in well-deserved praise of the superintendent, Mr. Marrington, and says of the mine that it is a true fissure, has large bodies of good ore, and is of the opinion that, with an expenditure of some \$5,000 for development work and the addition of some necessary machinery for concentrating and otherwise treating the ores, the mine can be made to yield a net revenue of not less than \$100 per day for an indefinite period to come. The high character of Mr. Riotte as an expert, settles beyond doubt all question of the superior merit of this property, and, as there are a great many mines of the same character in the immediate vicinity of the Chicago, Groom Creek may reasonably be expected to come to the front rank as a bullion-producing district of exceptional richness.

A SMELTER FOR THE WORONOCO CO.—*Tombstone Republican*, Feb. 10: Supt. Fowler, of the Woronoco G. & S. M. Co., informed a *Republican* representative to-day that one result of his recent visit East was the purchase of a 30-ton smelter for the mine under his charge, the machinery being now on the way. A 15-ton working test having been made at the Benson smelting works which gave such favorable returns that it was at once concluded to order the necessary plant. The well-known value of the San Diego mine, the property of the Woronoco Co., is a sufficient guarantee to stockholders that, with the smelter in operation, good dividends are a certainty. Thus one more bullion-producer is added to the camp.

Colorado.

STRIKE ON RED ELEPHANT.—*Georgetown Courier*, Feb. 8: An excellent strike was made last week in the Shenandoah Valley lode, on Red Elephant, consisting of from 4 to 8 inches of fine-grained galena, a sample sack of which milled 372 ounces of silver per ton. The lode is owned by W. H. DuLaney, Geo. W. Dollison, Albert Townsend, and H. C. Metcalf, who are working it by contract. It is opened by a tunnel 400 ft long. The drift has been driven along the side of the ore vein, which has been left standing, and last week a shot was put into it and broke down nearly two tons of ore from which the sample sack was taken. The ore has been uncovered for a distance of 80 ft and holds out well in the breast, which gives assurance that the mine in the future will be a profitable and steady producer.

New Mexico.

CARLISLE DISTRICT.—*Cor. New Southwest*, Feb. 7: This district called the Steeple Rock, but better known as the Carlisle district, is located about 50

miles north of Lordsburg, the nearest railroad station to this place. A day's stage runs to Richmond, which is situated 15 miles south of here on the Gila river. A hack-board and mail wagon comes to this place. The principal mine there is the Carlisle. It is owned by a Chicago company, and is managed by Mr. W. A. Farrish, the well known and renowned mining expert. The vein is 50 ft wide on top, and is a true fissure. It can be traced for a mile on the surface. The ore is a free milling gold quartz, and has a ground-stained appearance. At the bottom of the shaft is found considerable silver. Mr. Charles Ford, a well known Colorado mining man, took 10 samples from every part of the mine last week, and with a pan and blow test he found that the ore ran from \$30 to \$300 to the ton. Mr. Farrish says he has got enough \$20 ore on the surface to run a 20-stamp mill 2 years without sinking. The mine is beautifully located, being only 200 ft above the level of Carlisle creek. A new and handsome Fraser & Chalmers 10-stamp mill is being erected on the mine and is nearly completed. Mr. Farrish thinks he will have it running inside of 20 days. The hoisting works are situated about 30 ft behind the mill and the ore will be carried that distance into the top. The Steeple Rock camp is located about 2 miles east of Carlisle. The chief mine in the camp is called the "Rain in the Face." The owners of this mine have a shaft down on it 90 ft. They have a ledge 4 1/2 ft wide of silver ore that will run about \$200 a ton. Several prominent mining men have examined this property lately, and I think it will soon be sold from what I can hear. The Mayflower district is located about 6 miles west of Carlisle. This is a copper camp and contains several very promising prospects. The camp is a new one, and there has not been much work done as yet.

Montana.

NOTES.—*Butte Miner*, Feb. 7: Although with one exception, the amounts involved in transfers of mining property during January were comparatively small, the large number of transactions indicate a very healthy condition of the market; and the fact that the deal was in every case between residents of the district, who are thoroughly familiar with the value of the properties, is a gratifying evidence of the confidence of our own citizens in the future of the Summit Valley district. There were 26 sales during the month, for which the total prices paid was \$31,977. The largest sale was that of the Mountain View lode to Charles N. Larabee for \$20,000.

ALICE.—The activity which characterizes the operations in the Alice properties indicates that the mine is to be worked for all its worth this year. There is no reason why deep mining in this district should not be attended with as satisfactory results as were derived from the lower levels of the Constock lode, and the Alice company seems likely to solve the question definitely, as to whether or not this is a "surface camp."

MAGNA CHARITA.—The mine has become a bigger property than it was ever expected to be, and it has been found necessary to improve the facilities for handling its immense output. It has accordingly been decided to enlarge the shaft by the construction of a new pump compartment.

MOULTON.—The 3-ft vein uncovered last week by the 300-ft south crosscut, is developing in fine shape and widening with the drift. The ore is finer milling than that of the upper levels.

SHONBAR.—The east drift of the 185 level has advanced 70 ft on the ledge. The character of the ore has steadily improved, and during the past week a fine body of gray and pink manganese rock has been uncovered which assays from 150 ounces upward.

Idaho.

SENATE M. AND SMELTING CO.—At a recent election in New York city the control of this company passed to Edward Mathews and Col. E. Green, Mr. Mathews being unanimously elected President and Col. Green manager of the company. The Senate mine, and the Red Cloud, Chief, Nonesuch and Kid claims constituting the Senate group are all rich and permanent looking prospects, needing only the wholesome management now awarded them for speedy development into highly productive and prominent mines of the first rank on Wood river. During the past season the company has acquired a valuable lime quarry, known as the Scorpion claim, and the Red Cloud, Kid, Senate, Fraction, Nonesuch, Edith and Grey Eagle mill sites, all of which are locations that need only time to prove their worth. The smelting works already completed and in excellent running order, have been proven faultless by a trial run and stand ready for operation, with charcoal on hand for a 3 months' run.

Oregon.

COAL.—*Jacksonville Times*, Feb. 7: D. Reynolds of the Meadows has discovered a large vein of stone coal, which grows better as he goes down upon it. It is now 10 ft wide and the coal is of an excellent quality.

FARMER'S FLAT.—Miller & Kretzer's placer diggings on Farmer's flat, have been provided with hydraulic pipe and a little giant, and a good report may be expected from here if the season is at all favorable.

DISCOURAGEMENT.—Some of the miners are led to work during the warm part of the day, but generally speaking there is room for much discouragement. Should the spring be late, there will still be a chance for a good run.

Utah.

NOTES.—*Salt Lake Tribune*, Feb. 10: The information on which it was said in our mining review this week that the Emma mine, in Little Cottonwood, was shut down, proves inaccurate. The Emma is pushing work actively, and no snowslides are likely to affect it. We learn, also, that in spite of the snowslide which struck part of the Flagstaff surface belonging to the other day, that mine is also being actively worked. Workmen in the Northern Spy mine lately made a rich strike in the north drift on the 150 level. Samples of ore were assayed which showed \$7 in gold, 125 ounces silver, and 43 per cent. lead. A contract has just been let to extend the north drift 125 ft on the 250 level. The Artesian well at the Mingo's shafts has reached a depth of 1,016 ft, all the way through sand and gravel. The tools are still going down in search of bedrock and flowing water.

Mining.

Some brilliant genius in the East has finally decided that mining is a legitimate business; that when a dollar taken from the stubborn rocks costs a dollar in the extraction, still there is a saving, because the gathered wealth of the world has been increased by that one dollar. That is a right sensible view. Had the wise man read the *Tribune*, he would have found that fact out years ago. Moreover, he has "dropped on" the fact that a mining camp is not like any other, that instead of lowering the value of the other crops it touches with new life all the surrounding business of the country. That is another fact which the *Tribune* would have supplied, had he but read. He might have gone further still, and discovered that because of the \$1,500,000,000 in gold and silver which the mines of the West have turned out

bury it in the ground. They pay \$150,000,000 a year easily, because the money flows back among the people, and so it is handled over and over. But suppose it were to be buried or sent to China as fast as it is paid, how would it be in four or five years? There would be such squeezing, such panics, such utter prostration of business, such a depreciation of property and such despair as has never been seen in the New World. For this change the miners of the West have been working, and they should not be forgotten or their work underestimated, for more of the good of it has gone East than has remained in the West.

We hold that mining is the most legitimate work a man ever engaged in. He goes into the desert; from a spot which is worthless, to all appearances, he extracts from the matrix in which for ages it has been sleeping, something which savage and civilized men alike respect and covet; something which is indestructible and rare; something, the value of which is known and respected the world around, and something which in all lands stands for a measure of values, and

tion of its product—to Omaha, where \$700,000 were extracted from it; also, at Bonanza City, the Custer ledge, the giant among American mines, from whose unparalleled outcrop of 200 ft. above the surface four men, during 11 months last year, quarried ore which yielded \$1,100,000, and which has, through a small 20-stamp mill, poured out \$1,400,000 in the last 14 months. They will find at Idaho City a small area of the placer ground of one county which has produced \$20,000,000 in gold—more than a million a year for 18 years—and other larger areas, which in years to come will often duplicate Idaho's total placer yield of \$65,000,000. Silver City, Idaho, they will discover, is the home of the famous Elmore, which, with a small 20-stamp mill, in 30 days has poured out \$500,000, the largest month's yield, I believe, of one mine with a mill of this limited capacity yet recorded in the world. Among the tens of thousands of other quartz veins already found is the Morning Star, whose shipment of 100 tons from Silver City to the Atlantic seaboard, containing \$100,000, is fresh in the minds of at least the owners. A near neigh-

full text of the bill at hand as yet, but have received a brief outline of some of its provisions. It provides for the appointment of seven commissioners by the Governor, two of them to be residents of Mariposa county, and the remaining five to be appointed from the State at large. All are to hold office for four years from date of appointment, except two of the five at large, who are to hold office for only two years, to be decided by lot after the appointment.

The duties and powers are prescribed. They are to have charge of the Yosemite Valley and Big Trees, which belong to the State by virtue of Congressional enactment. They are to be a body with corporate powers. They are to select a suitable person, at a salary not to exceed \$1,500 per annum, to look after the Yosemite Valley and Big Trees and improvements under their supervision. The general intention of the bill seems to be the ousting of the present Yosemite Valley Commission, and if this be done we trust that the reappointment of the useful members of the present Board and their employees will follow. In this way the interests



HONDURAS OR TRUE CHINESE.

in the last 33 years, the face of his native land has been transfigured, and the people have accumulated more property than they otherwise would in 150 years. The speaker at the Pioneer supper in New York the other night said truly that no event since the discovery of America has been of so much consequence, in a material sense, as the finding of gold in California. Nothing less would have made possible what has since happened. Without it the war could not have been fought out; without it the payment of the debt would not have been possible for a hundred years to come, and the prospect would have been so gloomy that repudiation would have followed as it did after the revolution of 1776. The mines of the West have been the leaven of the whole land; because of them New York is swiftly becoming the world's commercial center, and real estate from the Atlantic to this side of the Mississippi river has doubled in value. The men of the East should begin to understand this by and by. They tell us that a wheat crop in Minnesota or a corn crop in Ohio is worth more than the gold and silver crop of the West. We do not desire to dispute the figures, but let them sit down and figure up how things would be if they were forced to gather together \$1,500,000,000 and

with which all reasonable things can be procured.—*Salt Lake Tribune*.

Production of Idaho Mines.

About the headwaters of Salmon, Boise and Wood rivers, in southern Idaho, is a region some 2,500 miles in extent, whose early history horders upon the marvelous. Until three years ago its nearest railroad was from 250 to 300 miles away from the leading mines, and the country was practically unknown. Since then it has had the Utah & Northern branch within 150 miles, and has managed to attract some attention in spite of the Leadville, Gunnison and Arizona stampedes. The Oregon Short Line will go to the head of it the coming spring, and the thousands of miners and others who make a pilgrimage in Pullman cars that way will have something of a surprise. They will find of local note at Atlanta the Atlanta ledge, which, traced for miles on the surface, is from 50 to 100 ft. wide, and has shipped (by wagon 300 and by rail 1,100 miles), a thousand tons—a small por-



LIBERIAN.

bor of the Morning Star, in trying to duplicate this output, fell only \$10,000 short, and added another brilliant achievement to those in mining history, by yielding \$4,000,000—\$1,000,000 for each 100 ft. of depth—in a comparatively brief period.

Along the Yankee fork of Salmon river they will perchance gaze in wonder at the Charles Dickens, whose great ore body is so rich that two men have pounded \$11,000 out of it in hand mortars in a single month. Or the Montana mine, where five men extracted \$80,000 last year in eight months, and shipped ore in 20-ton lots worth \$3,000 per ton. They will be shown thousands of pounds of ore from these mines glittering with the native gold, and worth \$5 per pound. These things come like a revelation from a region much of which is still marked unexplored country on some of our maps.

STATE BOARD OF FORESTRY.—Recently, Assemblyman W. L. Smith, of Mariposa and Merced, Chairman of the Committee on Yosemite Valley, Big Trees and Forestry, submitted a bill in the Assembly to create a State Board of Forestry. We have not the



NEEZANA.

of the State in these grand natural endowments can be well served.

Whether the bill provides for the general encouragement of planting out of trees to take the place of those now being used up we are not informed, but suppose that is left to a special bill on the subject yet to be introduced or to the enactment now in force.

THE SORGHUMS.—A large number of varieties of the plant *Sorghum vulgare* are now coming into prominence in this country, both as a source of cane-sugar and as valuable forage for farm animals. To show some of the characteristics of these new varieties, we take three heads of widely different manner of growth. The new varieties are coming continually from seed, and the well-known tendency of the species toward hybridization is being employed by propagators to secure varieties, with the special characteristics which they deem most valuable. The manufacture of cane sugar from sorghum has been pronounced a promising industry by the National Academy of Sciences, to whom the scientific aspects of the process were referred.

THE ENGINEER.

Engineering Enterprise in Hamburg.

The Senate of Hamburg, Germany, as recently reported in an exchange, have had under consideration a scheme for constructing a tunnel under the Elbe and an elevated railway in that city. The construction of a bridge instead of a tunnel is said to be out of the question on account of the width and crowded state of the harbor, and the author of the project has designed the tunnel of such dimensions as would provide both for vehicles and foot passengers, and a double track railway for freight and passengers. This he proposes to effect by building the tunnel of two stories, the road for vehicles and pedestrians to be in the upper story, and the line of railway in the lower story. The estimated cost of the tunnel and railway is \$6,250,000, and they are to be completed in five and a half years.

With its large ports, its vast docks, its hundreds of vessels arriving from all parts of the globe, Hamburg presents a most lively picture of maritime activity. In front of the principal portion of the town, on the opposite bank, is situated the island Steinweider, which contains a number of docks. Steamships are regularly conveying travelers and merchandise between this island and Hamburg. Hence the necessity of this important engineering improvement.

PROPOSED SHIP CANAL IN CANADA.—Some few years since a proposition was made to construct a ship canal across the isthmus which separates the Bay of Fundy from the Gulf of St. Lawrence, at a cost of \$8,000,000. The project was abandoned; but recently Mr. H. C. G. Ketchum, a New Brunswick engineer, has been before the Dominion Parliament. Last year Mr. H. C. G. Ketchum, a New Brunswick civil engineer, came before the Dominion Parliament with a proposal to substitute a ship railway over the same route, in place of the defunct canal scheme. He obtained a charter and a subsidy of \$150,000 per annum for 25 years, when and so long as the railway should be in successful operation. Mr. Ketchum carried the scheme to London, where he has succeeded in getting it taken up by an eminent English contractor, subject to the favorable report of his own engineer, who is now engaged with Mr. Ketchum in examining the site. If the scheme is carried out, the Dominion will be the first country in the world to possess a ship railway, and probably there is no other country which possesses a site more favorable to its engineering aspects for a perfect railway—that is, a ship railway without curves or grades.

SUBMARINE WORK. It is said that an English firm are engaged in putting into actual practice the Jules Verne's romantic device, put forth in his famous work, "Twenty Thousand Leagues Under the Sea." It will be recollected that his divers are represented by the author as putting on their armor in the usual fashion, and then attaching oxygen reservoirs at the back, going into the water free and independent of heavy air pumps and heavy dragging air pipes. The new English system calls for the manufacture of oxygen and its compression into tanks, which are strapped upon the armor. The carbonic acid of the breath is removed by means of caustic potash, and a fresh supply of oxygen takes the place of that used up by breathing. The diver is, of course, entirely independent of the surface, and can walk about as much at his ease as it is possible beneath the surface of the water, weighted by the usual amount of lead necessary to keep him submerged. The system is one of the most interesting things in its line brought before the public for many years, and submarine work will be greatly benefited by it. No doubt some time will be necessary to practically understand all the details of its working, as the system is not presented as being in a sufficient practicable state to be in every day use away from skillful attendance.

THE WASHINGTON MONUMENT.—Some 40 years ago, when the people of the United States had raised a considerable sum for the purpose, this monument was begun. When the monument had been built to 156 ft. in height the funds were exhausted. Finally the Government took hold and made appropriations to finish the work. But when the labor on it was renewed, examination showed that the foundation was not strong enough for the intended superstructure; but how to insert additional strength under a column weighing 32,000 tons without disturbing its equilibrium or making a crack in its walls, how to remove the dirt below this tremendous weight and insert concrete masonry therein, was a question that required inventive genius and delicate engineering. The difficult work was most boldly and successfully done. A solid body of masonry, about 126 ft. square, and more than 13 ft. in depth, now underlies this tall structure. It ought to have a solid base, for the monument, when finished, will have a total weight of over 80,000 tons. This pillar is now about 350 ft. high, and is rising in mid-air at the rate of nearly 100 ft. a year. From two to three more working seasons will be required to complete it. When completed it will be 555 ft. high.

USEFUL INFORMATION.

PRESERVATION OF BUTTER.—Dr. W. Hagemann has been investigating the cause of butter becoming rancid, which is the immediate result of the liberation of butyric acid. He says it is not the result of butyric fermentation, but is due to the formation of lactic acid from milk sugar, which is present in butter to the extent of 0.5 to 0.6. The lactic acid liberates an equivalent quantity of acids from the glycerides of higher carbon percentage. This, he thinks, explains why summer butter gets rancid more quickly than winter butter, and that artificial butter gives less cause of complaint than natural butter from spoiling.

To preserve butter, one of two methods may be chosen. Either the lower fatty acids are neutralized by caustic soda, which process was perfected by Prof. Adolf Mayer and Dr. Clausnitzer, or care is taken to remove the milk sugar, preventing its decomposition. The decomposition of sugar in cow's butter is caused by lactic acid bacteria, so that the first problem in the preservation of butter is to find some method for suppressing these bacteria.

FOR FENCE POSTS.—A writer in an exchange says: "I discovered many years ago that wood could be made to last longer than iron in the ground, but thought the process so simple that it was not well to make a stir about it. I would as soon have poplar, basswood, or ash as any other kind of timber for fence posts. I have taken out basswood posts, after having been set seven years, that were as sound when taken out as when first put in the ground. Time and weather seemed to have had no effect on them. The posts can be prepared for less than two cents apiece. This is the recipe: Take boiled linseed oil and stir in pulverized coal to the consistency of paint. Put a coat of this over the timber, and there is not a man that will live to see it rot."

CHEESE PREPARED FROM BEANS.—A late Indo-Chinese steamer, arriving at Marseilles, brought specimens of a bean which has long been used by the Chinese and Japanese as an article of food. Not only is it cooked and eaten like other vegetables, but it is made into cheese. By its composition it more closely resembles animal food than any other vegetable known to us, containing much greasy matter and albumen. A trial will be made to acclimate it in our southern departments. In the north it will not grow, owing to the uncertain and changing climate, and the temperature being too low. Besides these advantages, as an article of human food, the husks serve as very good fodder for horses and cows. The cheese made from the Japanese bean has a very delicate taste, much like Parmesan.—*London Daily News.*

TO KEEP THE GRATES BRIGHT.—When a grate is purchased, and you ask how to keep the polished parts as bright as they then are, you will almost always get an evasive answer, for what reason I never could understand. I would suppose that the vendors of grates would be pleased to know that the grates they dispose of would always look clean and bright after they have left their possession. I have, however, discovered a mode for keeping the polished parts of grates perfectly bright, without using an undue quantity of "elbow grease" either. It is simply to take a piece of flannel, moisten it with *coal-oil*, next dip in powdered *emery*, and rub, when brightness will suddenly appear, and the matronly heart will be gladdened.—*Cor. Germantown Tel.*

APPROPS OF aerial navigation, the following singular extract from the discourse of M. de Comberousse, pronounced at the funeral of the late Henri Gifford, will be read with interest: "An intimate friend of Gifford told me yesterday that he carried to the tomb the secret that he had long sought for, and which had revealed itself to his eyes during his last years. He added that our colleague shrank back from his own discovery, and, filled with horror, put an end to his own existence." "In other words," remarks the *Journal of Science*, in a comment on the above, "he saw, at length, that aerial navigation must prove the suicide of civilization."

THE FORMATION OF HAIR.—Each hair is formed of 10 or 12 smaller hairs, which unite at the root and form a hollow tube, somewhat like a very fine stalk of grass, jointed at intervals. The joints appear to overlap each other, as if one small tube were inserted into that which is nearest to it, and so on to the end of the hair. This structure, though invisible to the naked eye, may be made manifest to the touch. Take a hair several inches long, and work it between your thumb and finger, and you will find that it will always work toward the top end, and never (turn it as you will) towards the root end, proving that the rough overlappings are all directed to the top.

KILL YOUR FISH.—A French scientist, explaining why fish eaten in Holland are superior to those eaten in France, gives a hint that may interest fishermen in this country. He says that the Dutch fishermen kill their fish as soon as taken from the water by making a slight longitudinal incision under the tail with a sharp instrument. The French fishermen, on the contrary, allow their fish to die slowly and this slow death softens the tissues and renders them more liable to undergo change.

A HINT TO SMOKERS.—An English working-man, just past the middle age, found that his pipe, which had for many years been a great comfort to him, was beginning to seriously affect his nerves. Before giving it up, however, he determined to find out if there was no way by which he might continue to smoke without feeling its effects to an injurious extent. He accordingly wrote to a medical journal, and was recommended to fill the bowl of the pipe one-third full of table salt, and press the tobacco hard down upon it, as in ordinary smoking. The result was very satisfactory. During the process of smoking the salt solidifies, while remaining porous, and when the hardened lump is removed at the end of a day's smoking it is found to have absorbed so much of the oil of tobacco as to be deeply colored. The salt should be renewed daily.

WASHING harness with warm water and soap soon injures the leather. All varnishes, and blacking containing varnish, are injurious. When harness becomes rusty, give a new coat of grain black. Before applying this, wash the grain side of the leather with potash water, cold, until all the grease is removed. After the leather is quite dry, apply the grain black, and then oil and tallow. This fastens the color and makes the harness flexible and soft. Grained harness can be cleaned by a cloth moistened with kerosene, but should be immediately washed and oiled afterward.

TO REMOVE PUTTY.—Old putty may be readily softened and removed by using a paste of caustic lye, easily prepared by mixing carbonate of potash (or soda) with equal parts of freshly burned quicklime, which has been previously sprinkled with water so as to cause it to fall into powder. This should be mixed with water to a paste, and spread on the putty to be softened. If one application is not sufficient, it should be repeated.

A PAPER WATCH has been exhibited by a Dresden watchmaker. The paper is prepared in such a manner that the watch is said to be as serviceable as those in ordinary use.

GOOD HEALTH.

Tight Lacing.

This is a question, the mere mention of which is "tabooed" in polite society. He who is bold enough to protest against the prevailing fashions, whether of corsets, banded hair or high heels, must be prepared to encounter the frowns of the fairest, and, perhaps, excommunication from all social circles in which he dare exercise the liberty of free speech. It is utterly useless to attempt to convince young women of the evils that later come from lacing. No child is satisfied that fire will burn until his own fingers have been blistered, and, strange as it may seem, it is quite as difficult to convince matrons of middle age, when they have had their forms, from childhood, held in the grip of steel and buckram.

"Were I to leave off my corsets," says one, "I should be limp as a rag. These strengthen and sustain me." Quite right, madam, but why? Simply because you have worn corsets so long that they have appropriated the office that the muscles of the chest were intended for, and these, having nothing to do, have dwindled away or perished, leaving the upper half of your body to be supported by corsets. What nature has no use for, she finally dispenses with. She is generous, but, at the same time, exercises a wise economy, and does not long burden us with useless gifts.

Paralysis of the pectoral muscles is the least of the evils induced by lacing. Long continued pressure on the vital organs impedes their action and deranges their functions. It is a prominent cause of heart disease, consumption and spinal irritation. It is not necessary to be a physiologist to feel a sort of disgust for an abnormally small waist, or a philanthropist to pity its victim. There is something barbarous and repulsive in the fashion of making cripples of Chinese women by lacing their feet. Would it be more humane to make perpetual invalids of them by lacing their bodies?

SCIENTIFIC NURSING.—There is no subject of so much general interest as this, concerning which there is, at the same time, such a widely prevalent ignorance. There are few, especially among women, upon whom will not devolve, at some time in their lives, the care of the sick; fewer still, who will not at some time become dependent upon such care; and it might naturally be supposed that matters of such primary and universal importance as sanitary conditions and the practical application in the sick room of scientific principles would be too familiar to every one to need to be further enlarged upon. But the fact is, it too frequently happens that all the scientific knowledge which ever enters the sick room comes in with the doctor and goes out again with him. This state of things requires to be improved. Knowledge, and that correct knowledge we call science, is just as indispensable to the nurse as to anybody else. It is a great mistake to suppose that all women—even good women—make good nurses. The best intention and the tenderest heart may co-exist with an utter lack of executive ability, and be more than counterbalanced by ignorance and prejudice. Native aptitude gives advantage, but it cannot be relied upon alone. Even

those who possess in the highest degree the natural gift of ministrations which renders them so acceptable to the invalid, would find their power of usefulness very largely increased by a familiarity with what may be properly called the science of the sick room. Physicians are recognizing more and more the importance of hygienic agencies in the treatment of disease, and with this there has come an increasingly urgent call for the scientific instruction and practical training of those who are to take charge of invalids. Science explains the conditions upon which the art of the nurse depends, and lays down principles which cannot be violated without injury; but it is not at all necessary to make a parade of technical language in stating its requirements. *Popular Science Monthly.*

EFFECTS OF TOO MUCH BRAIN WORK FOR CHILDREN.—On April 28th, Dr. Richardson delivered a lecture on "Natural Necessities as Basis of Natural Education," before the Society of Arts, brought forward, writes F. C. S., the following extract, which happened to be a report of the chairman of the evening. Mr. Edwin Chadwick, C. B., to the British Association in 1860, to show what an evil effect too much brain work, without a proportional amount of industrial occupation to support it, has upon young children: "In one large establishment, containing about 600 children, half girls and half boys, the means of industrial occupation were gained for the girls before any were obtained for the boys. The girls were therefore put upon half-time tuitions, that is to say, their time of book instruction was reduced from 36 hours to 18 hours per week, given on the three alternate days of their industrial occupation, the boys remaining at full school time of 36 hours per week, the teaching being the same, on the same system and by the same teachers, the same school attendance in weeks and years in both cases. On the periodical examination of the school, surprise was expressed by the inspectors at finding how much more alert, mentally, the girls were than the boys, and in advance in book attainments. Subsequently, industrial occupation was found for the boys, when their time of book instruction was reduced from 36 hours a week to 18, and after a while the boys were proved, upon examination, to have obtained their previous relative position, which was in advance of the girls."

HOW DIMPLES ARE MADE.—This is the way dimples are manufactured in Chicago, if a reporter of the *Herald* of that city tells the truth: "My arm being bare and the exact spot indicated, he (the operator) placed a small glass tube, the orifice of which was extremely small, upon the spot. This tube had working within it a piston, and was so small that when the handle was drawn up the air was exhausted from the tube and it adhered to the flesh, raising a slight protuberance. Around this raised portion the operator daintily tied a bit of scarlet silk, and then took away his suction machine. The little point of skin that was thus raised he sliced off with a wicked looking knife, bringing the blood. I tried hard not to scream, but it was so unexpected that I had to. Then he bound up the arm, placing over the wound a small silver object like an inverted cone, the point of which was rounded and polished. This little point was adjusted so as to depress the exact center of the cut. Then he told me to go away and not touch the spot until the next day. When I came at that time he dressed my arm again, and this operation was repeated for five days, when the wound was healed. The silver cone was removed, and there, sure enough beneath it was the prettiest dimple in the world! And all I had to pay was \$10."

WHEN IS A PERSON DEAD?—A recent writer in the *China Review* exemplifies the difficulties surrounding interpretation from Chinese into English, or vice versa, by mentioning that simple question, Was he (or she) dead? which occurs so frequently in inquests and other judicial proceedings, admits of a positive or negative reply according to whether the European or Chinese idea as to when death occurs be followed. We believe that a man is dead when he has ceased to breathe, and when his blood no longer circulates; the Chinese consider him still alive while a trace of warmth lingers in the body. The two estimates may thus differ by several hours. Hence, it was that in inquests in Hongkong the time of death formed a stumbling block in almost every Chinese case. The medical evidence would show that the deceased must have been dead when brought to the hospital, while the relatives would swear he was alive at the gate. Subsequent inquiry showed that the general view among the Chinese was that a person is considered to be dead when the body is cold, and not before. It does not speak very well for the Chinese scholarship of the officials of Hongkong that it took about 40 years to discover this important distinction.—*Nature.*

HEADACHE.—Dr. Haley says (*Australian Medical Journal*, Aug. 15, 1881), that as a rule, a dull, heavy headache, situated over the brows, and accompanied by languor, chilliness, and a feeling of general discomfort, with distaste for food, which often approaches to nausea, can be completely removed in about 10 minutes, by a two-grain dose of iodide of potassium, dissolved in half a wineglassful of water; this should be so sipped that the whole quantity may be consumed in about 10 minutes.—*Glasgow Medical Journal.*

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SAN FRANCISCO:

Saturday Morning, Feb. 17, 1883.

TABLE OF CONTENTS.

EDITORIALS.—Cleavages of Minerals; The Ohmen Engine; The Davidson Wheel; Horses Underground, 105. A New Amalgamator; New Cut-off Valve Gear; An Inventors' Institute; Notices of Recent Patents, 106. The Sorghums, 110. Passing Events; American Association of Mining Industries; Miners' New Safety Lamp, 112. Notes from Eureka, Nev.; Mine Timbering—No. 3, 113.

ILLUSTRATIONS.—The Davidson Water Wheel, 105. The Sorghums, 110. Arrangement of Timbers in Staves, 113.

MECHANICAL PROGRESS.—Sawing Hard Steel with Sand; The Circular Saw Condemned; New Journal Bearing; Prosperity in Machine Shops; A Novel Tram Car Arrangement; Economy in Coal; To Preserve Wire Rope; A New Composite Pulley; American Machinery from English Workshops; Paper Car Wheels; American Woodworking Machinery; Increased Use for Aluminum; Railway Fire Service, 107.

SCIENTIFIC PROGRESS.—Science in Soap Bubbles; Hunger and Appetite; A Heavy Brain; The Scientific Argument for Thisism; Still Another New Gas; How to Saponify Sulphuric Acid, 107.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Assessments, Meetings and Dividends, 108.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana and New Mexico, 108-109.

THE ENGINEER.—Engineering Enterprise in Hamburg; Proposed Ship Canal in Canada; Submarines Work; The Washington Monument, 111.

USEFUL INFORMATION.—Preservation of Butters; For Fences Posts; Cheese Prepared from Beans; To Keep the Grates Bright; The Formation of Hair; Kill Your Fish; A Hint to Smokers; To Remove Putty, 111.

GOOD HEALTH.—Tight Lacing; Scientific Nursing; Effects of Too much Brain Work for Children; How Dimples are Made; When is a Person Dead; Headache, 111.

MISCELLANEOUS.—Copper Mining; Recent Contributions to the California State Mining Bureau, 106. Mining; Production of Idaho Mines, 110.

NEWS IN BRIEF—On page 116 and other pages.

Business Announcements.

Machinery—Tatum & Bowen, San Francisco.
Dividend Notice—M. & M. Co., S. F.
Dividend Notice—Silver King Mining Co., S. F.
Lithographer and Engraver—G. H. Baker, S. F.

Passing Events.

The most welcome event which has occurred for some time has been the fine rain storm which swept over California this week, bringing everywhere rejoicing and hopeful feelings among both miners and farmers. It has killed off the cold weather, thawed out the ice and done good generally.

Bullion shipments from the mines seem to have fallen off of late, no doubt influenced by the recent cold spell which has spread in every direction. Work is of course retarded more or less in the mining regions under such conditions.

Efforts have been made on this coast to get up a creditable showing of minerals for the coming Amsterdam exposition, and what has been collected will be sent away in about a week from now. Utah, Idaho, Montana and Colorado will be represented, but none of the other mining States or Territories.

We shall next week issue a double edition of the MINING AND SCIENTIFIC PRESS devoted more particularly to the interest of southwestern Nevada.

A SPIRIT thermometer in Butte, M. T., indicated 60° below zero during the late cold weather.

Amalgamating Pans.

The pans employed for grinding and amalgamation present a great variety in the details of construction. Of late, moreover, since many new persons have come into mining as a business, many forms have been proposed which have long since been found of no practical benefit. Since the first "common pan," a very simple form of apparatus, came into use, many inventors have exercised their ingenuity in getting up all kinds of details, mainly to get patents. Each of these forms has its advocates and friends, although of late the one commonly used is called the "combination pan," and is found to answer the purposes for which it was intended perfectly well.

The common features of all amalgamating pans are a round tub, usually of cast iron, but sometimes with wooden sides or wooden lining, from four to six feet in diameter, and about two feet deep, having a hollow pillar cast in the center, within which is an upright shaft projecting above the top of the pillar that may be set in revolution by gearing below the pan. To the top of this shaft is attached, by means of a key or feather, a yoke or driver, by which the muller or upper grinding surface is set in motion. To the bottom of the pan on the inside is fixed a false bottom of iron, generally in sections called dies, or in one piece having a diameter a little less than the pan and with a central hole adapted to the central pillar. This serves as the lower grinding surface.

The muller forming the upper grinding surface is usually a circular plate of iron, corresponding in size and form to the false bottom just described, having a diameter nearly equal to that of the pan, and a flat, conical or conoidal form, according to the shape of the pan bottom. Its under side is faced with shoes of iron or steel that may be removed and replaced at will. The muller is attached to the driver, which is put on and over the central pillar of the pan, and being connected with the interior upright shaft, as described, is thus caused to revolve.

There are various appliances for raising or lowering the muller so that it may rest with its whole weight upon the pan bottom, in order to produce the greatest grinding effect, or be maintained at any desired distance above it when less power or mere agitation are desired. Various devices are also in use for giving proper motion to the pulp, so that when the muller is in revolution the material may be kept constantly in circulation, passing between the grinding surface and running into contact with the quicksilver. Some pans are cast with a hollow chamber at the bottom for the admission of steam in order to heat the pulp, while others employ only "live steam," which is delivered directly into the pulp by a pipe. The operation of the pan consists in the further reduction or grinding of the ore to a pure pulp, and in the extraction of the precious metals by amalgamation with mercury. The amount of ore at each charge varies from 600 or 800 to 4,000 or 5,000 lbs., according to size of pan. The ordinary charge is 1,200 to 1,500 lbs.

An Absurd Proposition.

Twenty years ago if any man in California had prophesied that in 1883 a proposition would be made for the State Legislature to declare the working of placer mines a public nuisance, he would have been considered a lunatic. Yet last week such a thing occurred. A member of the State Senate named Kelly, from Solano, introduced an absurd proposition to that effect. The bill proposes to add two new sections to the chapter of the Civil Code relating to nuisances, as follows:

Sec. 3477. The working of placer mines by the method of mining distinctly known as the hydraulic process, the tailings, debris, detritus or refuse matter of which are carried or suffered to empty or flow into, or which do, either directly or indirectly, empty or flow into any of the navigable rivers or bays of this State, or into any of the principal tributaries of such rivers or bays, is a public nuisance.

Sec. 3478. In actions to abate nuisances described in section 3477 of this Act, where no damages are claimed, or for an injunction or restraining order, to prevent the commission or continuance of acts creating or causing such nuisances, all persons or corporations contributing to the creation, or causes, or continuance of the nuisance complained of may be joined as defendants.

THE Guion Line steamer Alaska made her last passage from New York to Queenstown in 6 days, 20 hours and 33 minutes.

American Association of Mining Industries.

The Commissioners of the mining States and Territories to the last Exposition have organized what is called the "American Association of Mining Industries," which is intended to continue such exhibits in the future, for the purpose of making known the vast mineral resources of the Western States and Territories.

The Association intends to assist in the organization of State and Territorial Associations of Mining Industries, for the purpose of collecting full and reliable statistics of the mines and mining resources of each district in the respective States and Territories, together with characteristic samples of the ores and minerals of each district, the extent and character of reduction works, and the market value of the output of the precious and useful metals, cost of extraction of the ores per ton, and cost of reduction, etc.

It recommends that action should be taken in each State and Territory to secure legislative aid for the erection of State or Territorial museums for the preservation and classification of the ores and statistics collected, and for the publication of catalogues of all ores and minerals collected each year, that are of commercial or scientific value, together with the amount and value of every useful metal or mineral produced in every mining district of each State or Territory and all other facts that have any important bearing upon the various mining industries of the country.

A committee of three was appointed to formulate plans for the collection and preservation of samples of ores and minerals, geological and scientific facts, and blank forms and directions that will ensure uniformity of method throughout the country, in the organization of State and local societies and the work to be performed by them.

The officers of the association are J. Alden Smith, President; J. E. Clayton, Vice-President, and R. A. Kerker, Sec'y. The headquarters are at Denver, Col. The executive committee is composed of J. Alden Smith, L. D. Phillips, E. Y. Naylor, J. P. Flynn and H. L. Thompson. The Directors are as follows: Arizona, T. B. Soren, Prof. J. A. Church; California, Prof. W. B. Ewer, Henry G. Hanks; Colorado, Prof. J. Alden Smith, Capt. L. D. Phillips; J. P. Flynn, E. Y. Naylor, H. D. Thompson; Dakota, J. V. Offenbacher; C. W. Robbins; Idaho, J. L. Onerdonk, H. Z. Burkhardt; Missouri, M. McLellan, L. B. Woodside; Montana, J. B. Reed; Nevada, E. T. George, B. G. Smith; New Mexico, Prof. W. B. Sloan, Dr. Geo. S. Haskell; Utah, O. J. Hollister, Prof. J. E. Clayton; Sonora—Old Mexico, Con. T. Cutler, George Parsons; Wyoming, Gov. Jno. H. Hoyt, Prof. Bailey.

Expositions will be held annually, and therefore to perfect the necessary arrangements as well as the advancement of the mining interests of the country at large, it is deemed advisable by the commissioners to the recent exposition acting in conjunction with the legitimate mine owners, to perfect a national organization of miners of America for the purposes named. The annual fees of membership are five dollars. It may be remembered that there was some dissatisfaction with the management of the Colorado Mining Exposition of last year, and that it was hoped there would be a change if a successful exposition was to be expected this year. As we understand it, this association, of which we speak, is not in sympathy with the management of the previous exposition.

DOUBLE EDITION.—We shall next week issue a double sheet edition of the MINING AND SCIENTIFIC PRESS, and shall devote a large portion of our space to the mineral region of southwestern Nevada. The edition will be very fully illustrated, and will be of interest and value for reference and preservation. A new map of the region will be given, among other things showing the location of all the mining districts of that part of the State.

It is a well-known fact that all coal miners spit black, and that this continues for a month after they have left the colliery; many of them are attacked by a malady which is peculiar to them, caruncular melauosis; a kind of stopping up of the lungs. After 40 years' work, there are few men who do not suffer, and the penetration into the lungs is so complete that if, after 10 years' cessation from work, a miner be attacked with acute bronchitis he sees the coal reappear in his expectoration.

Miners' New Safety Lamp.

There are generally two kinds of safety lamps used in fiery mines. One, like the primitive Davy lamp, is surrounded from top to bottom with a metallic gauze of a greater or less degree of fineness; the other, in order to furnish a better light, is supplied at the base in front of the burner with a short crystal cylinder, suitably protected by thick iron wire, and firmly fastened to the metallic gauze placed above. These two kinds of lamps render undoubted services, but cannot, however, provide complete immunity from accidents. They show the presence of gas but do not prevent explosions. The new Birekel lamp guards against the difficulties. It is so arranged as to not only indicate the presence of gas, but to go out automatically if there is much of it. The Birekel lamp belongs to the species of lamp with a crystal cylinder. It differs from the old lamps by a double case made of tin, which completely covers the metallic gauze. The interior case is fixed to the gauze itself; the exterior case can slide round the interior with a gentle friction. For the admission of air and the emission of the products of combustion of the oil, the two cases are pierced with a certain number of vertical openings made in the tin, parallel to the lines of the cylinder. For the lamp to work, it is evident that the openings of the movable outer case shall correspond to those of the fixed case. This is the ordinary state of things. In this state the lamp burns easily, and gives a good light through the crystal cylinder. The attentive miner recognizes the presence of gas, by signs which are well known to all—the blue halo round the white flame. To avoid all danger, it is sufficient for him then rapidly to turn the movable case. The openings are then closed and the lamp is extinguished. But here again this pre-supposes that the miner watches the lamp and not his work. The danger of explosion is not therefore overcome. But here is the expedient to which M. Birekel has recourse. He has observed that in reducing the width of the apertures, by the partial rotation of the gas to six or seven millimetres, the pure air no longer was furnished in sufficient proportion to maintain the combustion of the burner, as soon as the atmosphere became explosive. Under these conditions, therefore, the lamp is spontaneously extinguished. The danger of explosion is thus seen to be avoided automatically by the lamp itself. At Pechellbronn, France, all the miners have been using this lamp two years, without there having been any accident.

Duty on Quicksilver.

We recently had an article on the question of putting a duty on quicksilver, giving the reasons advanced for taking it off the free list. The following dispatch from Washington shows the action taken: The House yesterday agreed to recommend a duty of 25% on quicksilver. Mr. Page moved that the duty be fixed at 35%, and, at Judge Kelley's suggestion, compromised on 25%. The product had increased from 7,723 flasks in 1850 to 1,197,095 flasks in 1880, although during the last few years the product had decreased, owing to foreign competition. Kelley explained the use of quicksilver in mining, and advocated the imposition of a just rate of duty, which he thought was 25%. Mr. Berry said that while he was not advocating a tariff for protection, he wished quicksilver to have it. He was inclined to favor a lower rate than 25%. He said that every gold mine in California used it, and if the duty were increased in price, every miner in the State would feel it. He wished a fair protection for quicksilver, but not such protection as would increase its price. Mr. Rosecrans claimed that the history of quicksilver manufacturing on the Pacific slope showed that when the duty was taken from quicksilver, most of the small manufactories were ruined, and only four or five of the large companies survived. They made combinations with owners of the foreign product, and prices were increased. Since then the manufacture had been greatly reduced. He said the miners were willing to pay a small tax, as an insurance against big monopolies, by the development of small mines. There would then be more competition, and a reduction in price would follow. Sparks moved to amend Page's motion, by fixing the duty at 10%. This was voted down. Mr. Berry voted for the 10% rate, and dodged off on the 25% proposition. That was agreed to by a close vote of 79 to 75.

Notes from Eureka, Nevada.

[From our Own Correspondent.]

Signs of new life continue to crop out in our self-reliant camp, and local companies are organizing for the purpose of doing the work that in other places would not be done without the aid of foreign capital. Since the Ruby Hill Tunnel Company was organized others talk of similar enterprises, and I have no doubt that when the spring opens Eureka district will be the scene of much greater activity. Every day comes the intelligence of a "new strike." Nothing to cause great excitement, but something to encourage one and induce him to strive just a little harder. The time was when miners laughed at the idea of striking ore 1,000 feet beneath the surface, by driving a tunnel for that purpose, but since a fine ore channel has been discovered in the Eureka tunnel, and it has been shown that the body is richer, for its size, than any other yet found in Eureka district, there has been shown

A General Disposition to Prospect.

In that way. Other enterprises of the kind are about to be brought forward, and where the surface titles are without conflict, there appears no good reason why any tunnel scheme, now under way or even projected, should not pay back to the adventurer every dollar he may invest in any of them. The Eureka Tunnel ore body still holds out, and during the past three days nearly 50 tons have been extracted. The new hoisting engine will be in place and ready to run by about the 1st of March. The shaft will be sunk to a depth of 105 feet, and a drift run to connect it with the bottom of the winze from south drift. The shaft will then be carried down to a depth yet undetermined, and a new level started. The Ruby Hill tunnel, which enters Prospect mountain from the west side is looking well. A new contract was let to-day to run another 100 ft. What is wanted to facilitate the work is an Ingersoll "Eclipse" drill, which is just the thing for the place. The cost of operating one would not exceed much that of hand drilling, and the time saved would soon repay the extra cost. A little capital is needed. A company might be formed for the purpose of operating drills by compressed air, in this camp, that would undoubtedly derive large profits from their investments. There are many good properties in the camp.

Owned by Poor Men.

Who would give a large interest in their claims to ensure their rapid development, and they would offer good terms to such a company. Rapid development in Eureka district is a matter of much greater importance than a reduction in the price of labor.

On Ruby Hill there is very little change. On the main level of the Albion mine it is said that there is a very good prospect for striking ore. I believe that it is in a drift that has been run a great length on a fissure. Molybdates of lead and iron are coming in at the face, which are sure to lead to ore. I have not seen this, but it is important if true. There is nothing new at the Richmond or Eureka Con., unless it be a

New Kind of a Lamp

Now in use in the Lacon shaft. The water falls upon the light and does not extinguish it. It is a fine thing for a wet shaft, but I should say, rather dangerous for a dry one. It is known as the Vapor Oil Lamp, and manufactured by the Vapor Oil Stove Company, of Cleveland, Ohio. The first one brought here was recommended to Supt. Read, by Mr. Moore, of the Risdon Iron Works, where I understand they are extensively used. The advantage of this lamp, in wet places underground, is of so much importance, that I deem it my duty to call attention to it. At the Jackson mine there are many places where a great deal of prospecting has been done, and with poor results. Here tributaries have been at work for some time past, and are now ferreting out some good ore. These tributaries find ore in places where companies cannot work to advantage, and, as a class of miners, are very important. Many of them prefer tributating to day's pay, as they are not subjected to dictation from the bosses. They go to work and quit when they please, which suits them.

The Silver West mine, situated westerly from Adams Hill, has been leased to a party of miners for one year. This property, in the early days of the camp, paid well, as I understand, and I believe, from all the indications, that it will again come to the front.

Within the past week, about 100 tons of high grade ore has been sent to the Eureka Con. furnaces from the Home Ticket mine, the property of the Ruby Dunderbug Co., an English corporation. This ore is coming from close by the Clipper mine into which it will strike. On this account, several applications have been made to the owners of the Clipper for a tribute pitch, and arrangements will probably be entered into that will be of mutual benefit to the owners and the tributers. The Golden Rule tunnel will be turned in a direction to intersect this fissure. There are fine prospects now in the Unele San Con. mine. The north drift has cut through the quartz, and is now being driven on a seam of good looking iron.

The Magnet Series of patented locations have been bonded for sale. The property is a valuable one, and whoever buys it, will secure a prize well worth the having. Over \$12,000 bullion was shipped to San Francisco last week, by

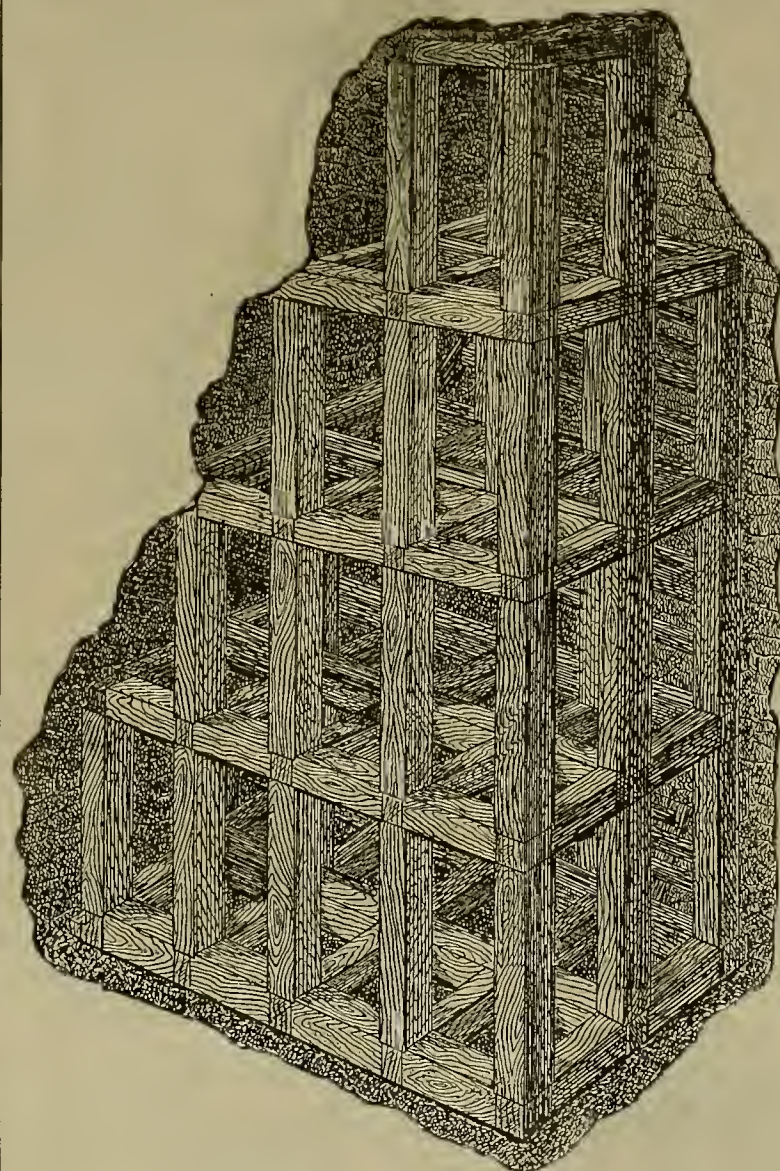
Wells, Fargo & Co.'s Express, from the Bertrand mill. This was the half of a month's run. The leaching process is pronounced a success in this locality, and I hear other works will shortly be erected as the result. M. H. JOSEPH.
Eureka, Nev., Feb. 12, 1883.

Big Bend Tunnel.

By far the most important mining enterprise projected and under way in Butte county is the Big Bend tunnel, on the north fork of Feather river. Some three years since it was discovered that it was possible, by a tunnel 12,000 ft. long, to carry all the water of Feather river at its low water stage, and thus drain and render available for working 13 miles of river channel, what is known as Big Bend of Feather river. The magnitude of the work required a heavy outlay of capital, estimated at \$1,000,000, which has been secured from Eastern capitalists, and

far into the millions. Some time since when the project was first broached we gave a detailed description of the plan with a diagram showing course of tunnel, etc. At that time we gave an abstract of the report of the engineer who examined the location. Work is now progressing on the tunnel.

TOURISTS' ILLUSTRATED GUIDE.—We have received, with the compliments of the author, Major Ben C. Truman, the handsomely illustrated guide to the celebrated summer and winter resorts of California. The printing, lithographing, etc., were executed by H. S. Crocker & Co., and was the largest printing job ever handled in this city, the edition being 25,000 books of 240 odd pages. Of this edition, the Central and Southern Pacific railroad companies take 2,000 for free distribution—3,000 are to be sent to Australia, 1,000 to China, 2,000 to New York and 1,000 to Boston, and the balance are to be distributed to all first-class passengers passing



ARRANGEMENT OF TIMBERS IN STOPES.

the requisite surveys and examinations having been made, work was commenced on the lower or Dark Canyon end of the tunnel about the first of last December. The dimensions of the tunnel are to be, length 12,007 ft., width 15 ft., height 8 ft. It will be 1,400 ft. below the top of Big Bend mountain at one point. It will be run from the Dark Canyon face almost entirely, though it is intended, if found practicable, to work from the upper end also. A Barleigh drill carriage working four drills is used, and 45 men are employed in all capacities. The rock, so far as the work has progressed, is slate, requiring no timbering, and from surface indication it is expected that it will be the only rock encountered. It is estimated that about two years will be required to finish the tunnel and other necessary works to render the river bed available for working. N. A. Harris is the Superintendent in charge.

It is, of course, premature to speculate on the amount of gold in the river bed that will be taken out when the water is turned into the tunnel, but if the results obtained in working small portions by wing dams, etc., and the yield of the several bars are to be considered data to estimate from, it will be simply enormous and

Carlin and Merced, except 2,000 which are to be mailed to all the prominent hotels, libraries, clubs, and to noted Knights Templar, during the months of January and February. The other 5,000 have been purchased by Mr. E. S. Denison, who will dispose of them to the trade, so that retail book-sellers may sell them at the low rate of 50 cents each. Major Truman has made a very interesting and entertaining book, which does not read like the ordinary guide book. The descriptive matter is well written, and shows marks of careful and intelligent observations. A noticeable feature is the "Route of Travel and other Information," appended to each chapter, where is given just the very information the tourist looks for, as to hour of departure of stage or train, distance, time of arrival, hotels, accommodations, attractions, amusements and resources of the place, etc. All this is in condensed form. Even old Californians will be interested in this little work, as it describes all parts of the State. A valuable feature is that describing the mineral springs of California.

THE ALLISON RANCH MINE.—It is stated, upon very good authority, that the old Allison Ranch will be started up at an early date. That is the sort of news we like to hear. The Allison Ranch ought never to have been closed down, as any one acquainted with its history can testify. It is regarded now, by experienced men, as one of the best mining properties on the coast, and it is a matter of regret that it has been idle so long.—*Foothill Tidings.*

Mine Timbering.—No. 3.

The stoping is, as already observed, all carried on overhand; that is, a station or level is opened under the body of ore to be worked out and the progress of mining goes on from below upwards. In commencing the timbering of a stope, as, for instance, at a new station or level, commonly called the "track floor," the ground sills are usually laid parallel with, though sometimes at right angles to, the direction of the stope, or the walls enclosing the body of ore, and are frequently timbers of sufficient length to serve at the sills for several sets. The end of a ground sill is so framed, projecting a few inches beyond the last post, that the next adjoining sill timber, to be laid as the stope progresses, may be spliced to the one already in position, the joint being made under the post, as shown in the engraving given with No. 1 of this series.

The sills being laid and the cross-pieces adjusted in position, the posts are raised and the cap timbers are fixed in their places, everything being fitted carefully and closely together. No pins, bolts, or keys are employed in the framework. The walls of the chamber are sustained by a lagging of plank, inserted between the timber frame and the adjacent rock. This lagging consists of three-inch or four-inch plank, laid next the timbers and wedged, when necessary, by spiling. In time the lateral pressure of the ground holds everything firmly in place.

After a set of timbers has been introduced and finally put in place, a floor of three-inch planking is laid upon it to serve as a footing for the workmen in the space above. From this comes the local term of "floor" to designate any particular place or point in the mine; the stations or levels, about 100 ft. apart, being numbered from the surface down, first, second, third, etc., the floor being similarly numbered upwards, between the several stations or track-floors.

In working a stope thus, the whole width of the workable ground in the body of ore is taken down at once and the timbering supplied in its place, the advancing breast of the stope being carried forward from wall to wall; in bodies of ordinary width, this is from 10 to 20 or 25 ft., requiring, therefore, in cross-section from two to six sets of timber, like those just described.

In commencing a stope on the level of a new station, the ground set or first floor is put in, and as soon as sufficiently advanced in the direction of the stope the next set above is placed on the first of those below. Both then progress at about the same rate, the lower floor being kept sufficiently in advance of the upper to furnish platform and working room for the men above. As the work progresses, one set or floor is raised above the other until the station above is reached, each floor being kept a little in advance of the one next above, as indicated in the engraving shown last week, but better by the one on this page.

When it becomes necessary on account of the unsettled character of the ground, or for other reasons desirable, to extract the body of the ore as speedily as possible, it is not uncommon to commence, at the same time, a floor on the level of the station and another floor half way between the given station and the one above. For this purpose a winze is sunk from the upper station to the one below. From this winze the stopes are started, one on the lower station and one 50 ft. higher. The lower series of floors, usually six or seven in number, rising one above the other, arrive at length directly under the 50-foot sill, as the lower floor of the upper series is termed. By this time the mass of timbering is held in place by lateral pressure with sufficient security to allow of introducing without difficulty the timbers to be placed directly under the 50-foot floor. We gave in the engraving of last week an illustration of this proceeding. The main body of stopes, visible in the drawing, were started and carried on from the winze, that connects the upper with the lower level. The stoping on the extreme left, proceeded in a similar manner from another winze, further to the left, the stopes advancing to meet each other. After the available ground has been exhausted, the plank of the floors are removed for use elsewhere, and the vacant chamber filled with waste material. This is the custom on the Comstock and elsewhere on this coast. The expense is, of course, great, both for material and labor; but the work is thorough.

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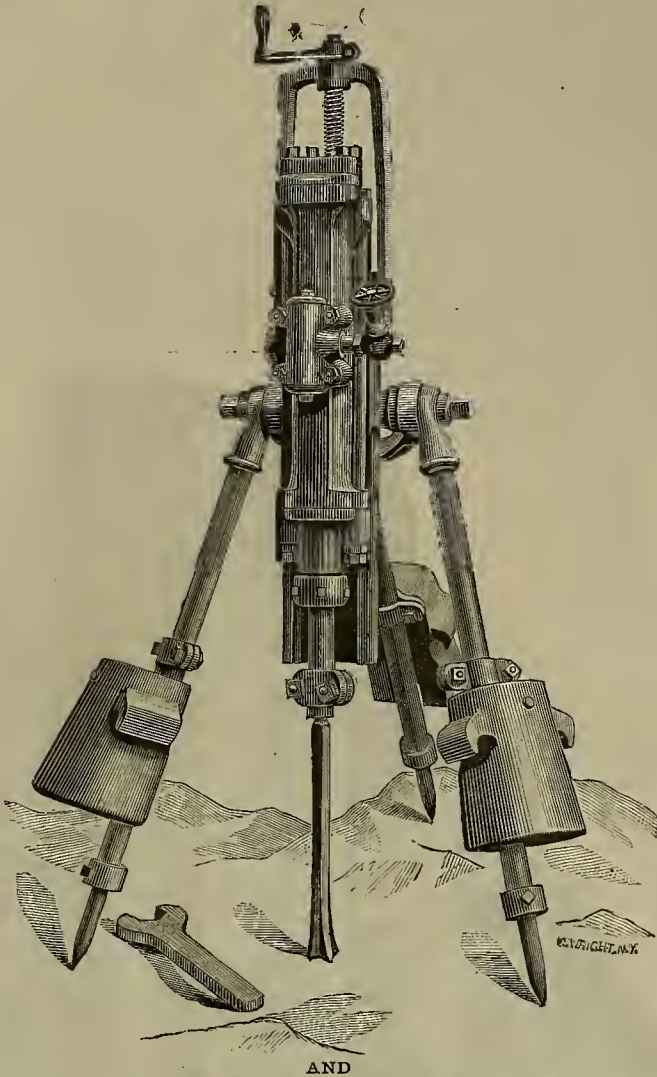
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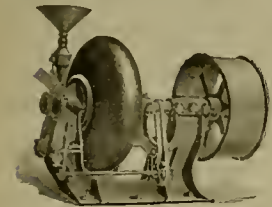
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Mechanic, Farmer, and Business Man. Gives 200,000 items for Gas, Steam, Civil and Mining Engineers, Machinists, Millers, Blacksmiths, Founders, Miners, Metallurgists, Assayers, Plumbers, Gas and Steam Fitters, Brazers, Glaziers, Metal and Wood Workers of every kind, Builders, Manuf'rs and Mechanics. 500 ENGRAVINGS of Mill, Steam, and Mining Machinery, Tools, Sheet Metal Work, Mechanical Movements, Plans of Mills, Roofs, Bridges, etc. Arrangement and Speed of Wheels, Pulleys, Drums, Belts, Saws, Doring, Turning, Planing, & Drilling Tools, Flour, Oatmeal, Saw, Shingle, Paper, Cotton, Woolen, & Filling Mill Machinery, Sugar, Oil, Marble, Threshing & Rolling Mills, etc., Cotton Gins, Presses, &c. Strength of Teeth, Shafting, Belting, Friction, Lathes, Gearing, Screw Cutting, Finishing, Boring, Building, Repairing and Operating, Setting of Valves, Eccentrics, Link & Valve Motion, Steam Packing, Pipe & Boiler Covering, Scale Preventives, Steam Heating, Ventilation, Gas and Water Works, Hydraulics, Mill Dams, Horse Power of Streams, etc. On Blast Furnaces, Iron & Steel Manufacture, Prospecting and Exploring for Minerals, Quartz, and Placer Mining, Assaying, Amalgamating, etc. 64 TABLES with 500,000 Calculations in all possible forms for Mechanics, Merchants and Farmers. 800 items for Printers, Publishers and Writers for the Press. 1,000 items for Grocers, Confectioners, Physicians, Druggists, etc. 900 Health Items. 500 do. for Painters, Varnishers, Glaziers, etc. 500 do. for Watchmakers & Jewelers. 400 do. for Hunters, Trappers, Tanners, Leather & Rubber Work, Navigation, Telegraphy, Photography, Book-keeping, etc. in detail. Strength of Materials, Effects of Heat, Fuel Values, Specific Gravities, Freight by rail and water—a Car Load, Storage in Ships, Power of Steam, Water, Wind, Springs of Castings, etc. 10,000 items for Housekeepers, Farmers, Gardeners, Stock Owners, Bee-keepers, Lumbermen, etc. Fertilizers, full details, Rural Economy, Food Values, Cure of Stock, Remedies for do., to increase Crops, Pest Poisons, Training Horses, Steam Power on Farms, LIGHTNING CALCULATOR for Cubic Measures, Ready Reckoner, Produce, Rent, Board, Wages, Interest, Coal & Tonnage Tables, Land, Grain, Hay, & Cattle Measurement. Seed, Planting, Planting & Breeding Tables, Contents of Granaries, Cribbs, Tanks, Cisterns, Boilers, Logs, Boards, Scantling, etc., at sight. Business Forms, all kinds, Special Laws of 19 States, Territories and Provinces (in U. S. and Canada), relating to the Coll. of Debts, Exemptions from Forced Sale, Mechanics' Lien, the Jurisdiction of Courts, Sale of Real Estate, Rights of Married Women, Interest and Usury Laws, Limitation of Actions, etc.
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Good water, rich soil and magnificent view. High elevation, dry air, few fogs and northerly.

No brush or fences on the land, which is especially adapted to the culture of the orange and raising grape.

Near to church, school, store and depot. Hotel open. Telephone Communication.

Stage from San Bernardino Tuesdays, Thursdays and Saturdays.

The price of land has steadily advanced from the first price of \$50 per acre until now it is held at \$200 per acre.

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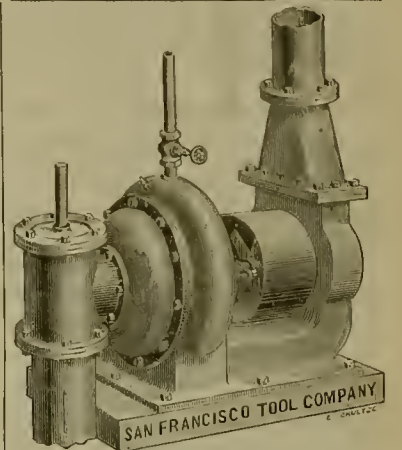
We guarantee our COMPOUND to remove all scale and prevent any more being deposited. The COMPOUND forming a glazed surface on the iron, to which no scale will adhere and which preserves the iron. The preparation is strictly vegetable, and is warranted to do all that is claimed for it without injury to the metal. Send for a circular.

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Has no surplus verbiage. Contains Dr. Raymond's Glossary. Explains how to examine mining titles. Contains numerous court decisions. Gives the Public Land Commission's Codification, and gives many improved forms. Price—Full law binding, extra paper, 650 pages, \$6.00. For Sale by DEWEY & CO., San Francisco.



Irrigation! Reclamation! TURBINE PUMPS.

1,000 to 20,000 Gallons a Minute. \$100 to \$1,000
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Manufactory, 17 & 19 Fremont St., S. F.

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Best Upright Engine and Boiler combined, Best Hoisting Engine and Boiler combined and Best Upright Engine in motion to

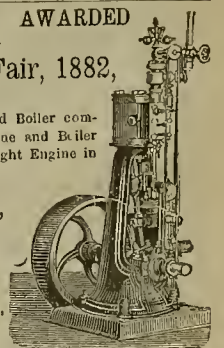
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PACIFIC POWER CO.

Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

SULPHURETS.

Clean Concentrations wanted. A party from the East veng a process for working low-grade Sulphurets, will commence purchasing the same as soon as assured of an abundant supply. Gold-bearing Sulphurets preferred, having an assay value of \$20 per ton, or upwards. Address, A. B. WATT, P. O. Box, 2293, San Francisco.

AGAINST THUNDER POWDER.—The trial of the case of H. A. Haywood against the Thunder Powder Co. has been concluded before Superior Judge Lawler and a jury, resulting in a verdict in favor of plaintiff for \$7,500 damages. Haywood had the sight of his right eye destroyed, his left eye permanently injured, his left arm broken, 15 of his teeth knocked out and his upper jaw broken by the premature explosion of a charge of the defendants' powder which he was tamping near Salt Lake City on June 10, 1881. The plaintiff was a traveling agent for the defendant company, and was experimenting with the powder when it exploded. It appeared on the trial that the company represented to him that the powder would only explode from heat and concussion combined, and that it could be tamped with an iron rod with safety. The tamping was being done by plaintiff with iron. This is one of the instances where the people who made the powder did not use it themselves, and where the managers were reckless in their statements, not knowing really the exact nature of the compound they were using. The powder is no longer manufactured.

The following are some of the appropriations in the River and Harbor bill: Oakland, Cal., \$80,000; Yellowstone river, \$10,000; Red river of the North, \$10,000; Wilmington, Cal., \$30,000; entrance to Coos bay and harbor, Or., \$20,000; entrance to Yaquina bay, Or., \$30,000; mouth of Columbia river, Or., \$750,000. The last is the only appropriation for new work in the bill.

News in Brief.

THE sea swallowed up 1,790 vessels last year, involving a loss of 4,129 lives. Within the last five years 20,763 persons have perished at sea, not counting this year's disasters.

VICE-PRESIDENT HUNTINGTON, of the Central Pacific, said, recently, that there was no foundation for the talk of the union of the road with the Union Pacific.

COMMODORE T. S. PHELPS, Commandant at Mare Island Navy Yard, has received orders to be in readiness to take command of the South Atlantic squadron.

PETER COOPER was 93 years old Saturday. The event was quietly celebrated by a dinner, at his residence, on Lexington avenue, at which about 30 guests were present.

The outlook of crops generally throughout Great Britain is gloomy in the extreme. No part of the continent, east or west, has escaped rains and inundation. The immediate destruction of property has been widespread, but it is insignificant, as compared with the damaged prospects of the year.

The ordinance, prohibiting the maintenance of dangerous balconies, hanging gardens, etc., is being strictly enforced in Chinatown, where it has been violated the most openly.

The Editorial Excursion.

The Riverside Press and Horticulturist gives the following outline of proceedings of the approaching editorial excursion to the southern counties of California:

The arrangements are nearly completed for the editorial excursion to leave San Francisco on March 12, 1883, and proceed at once, without stop, to San Diego via Colton and the California Southern, arriving in San Diego on Tuesday evening, the 13th, putting up at the Horton House.

On Wednesday morning carriages will take the excursionists to the Cajon valley, thence through Spring valley to the Sweetwater, thence to National City, taking dinner at the National City Hotel, and spending the evening at the National Grange Citrus Fair, returning to the Horton House about 9 o'clock, where a reception will be tendered them by the citizens of San Diego.

On Thursday morning the excursion will return to Riverside to attend the Citrus Fair afternoon and evening.

On Friday a drive will be taken down Magnolia avenue and through the settlement. A reception will be tendered the visitors in the evening.

On Saturday the excursion will proceed to Ontario by rail via Colton to witness the laying of the corner stone of the Chaffey College of Agriculture, lunch being provided for them by the Chaffey Bros. A ride to San Antonio canyon and over the tract will be a portion of the programme.

On Saturday night the excursion will proceed to Los Angeles to remain over Sunday, when each member of the party will be at liberty to go where he pleases and return home at will, tickets being good until April 1st.

Circulars will be issued giving full details in a few days. Tickets will be sold, covering all traveling expenses, hotel bills, etc., for a little over \$30.

LADIES and sickly girls requiring a non-alcoholic, gentle stimulant, will find Brown's Iron Bitters beneficial.

A Cheerful Recommendation.

BENTON, CAL., February 4, 1883.
Messrs Dewey & Co., Patent Solicitors:—I am in receipt of my patent, "Improvements in Vehicle Brakes," obtained through your Agency, and would say I am much pleased with thorough and graphic description in specifications and drawings, and can cheerfully recommend you to anyone wishing to obtain favors in your line.—Truly yours, G. R. DEVAL.

San Francisco Metal Market.

[WHOLESALE]

[THURSDAY, Feb. 15, 1883.]

ANTIMONY.—		
Per pound.	—	@ 15
IRON.—		
American Pig, soft, ton.	27	@ 23 00
Scottish Pig, ton.	—	@ 23 00
American White Pig, ton.	—	@ 23 00
Oregon Pig, ton.	—	@ 23 00
Clippers Gap, Nos. 1 to 4.	—	@ 23 00
Reinforced Bar.	—	@ 5 50
Horse Shoes, keg.	—	@ 7 70
Nail Rod.	—	@ 7 70
Norway, according to thickness.	—	@ 7 70
STEEL.—		
English Cast, lb.	16	@ 25
Black Diamond, ordinary sizes.	—	@ 14
Drill.	15	@ 16
Machinery.	12	@ 14
COPPER.—		
Ingot.	—	@ 22
Sheet.	37	@ 33
Sacating, Tinned 14x18.	—	@ 31
Nails.	—	@ 33
Old.	—	@ 8
Bar.	—	@ 15 1/2
Cement, 100 fine.	—	@ 15 1/2
LEAD.—		
By the Cask.	—	@ 9
Zinc, sheet 7x3 ft. 7 to 10 lb. less the cask.	—	@ 10
Assorted Sizes.	4 00	@ 4 75
QUICKSILVER.—		
By the flask.	—	@ 37 1/2
Flasks, new.	—	@ 1 25
Flasks, old.	—	@ 1 05

General Merchandise.

[WHOLESALE]

WEDNESDAY M., Feb. 14, 1883.

CRYSTAL WAX.	15	@ 17
Stearic Acid.	—	@ 14
Eagle.	—	@ 12
CANNED GOODS.		
2 1/2 lb cans.	2 25	@ —
Table do.	3 50	@ —
Jams and Jellies.	7 50	@ —
Sardines, 1/2 gal.	3 25	@ —
Sardines, 1/2 box.	1 87	@ —
Ht Boxes.	2 50	@ 90
Merry, Faulk & Co.	—	@ —
Preserved Beef.	3 25	@ 30
2 lb. doz.	3 25	@ 30
do 4 lb. doz.	6 50	@ 60
Preserved Mutton.	—	@ —
2 lb. doz.	3 25	@ 30
Beef Tongue.	5 75	@ 60
Preserved Ham.	—	@ —
2 lb. doz.	5 50	@ 60
Deviled Ham, 1 lb.	—	@ —
do Ham 1 lb. doz.	3 00	@ 30
do Ham 1 lb. doz.	3 00	@ 30
Somerset Figs Feet.	—	@ —
2 lbs.	3 50	@ 75
3 lbs.	2 75	@ —
Spiced Fillets 2 lbs.	5 50	@ —
Head Cheese 3 lbs.	3 50	@ —
COAL-JOBBER.		
Australian, ton.	—	@ 8 50
Coos Bay.	—	@ 7 10
Sellingham Bay.	—	@ —
Seattle.	—	@ 7 00
Cumberland.	—	@ 7 00
Mt Diablo.	—	@ —
Lehigh.	—	@ —
West Hartley.	—	@ 10 00
Scotch.	—	@ 9 00
Scranton.	—	@ —
Vancouver Id.	—	@ —
Wellington.	—	@ 10 10
Charcoal, sack.	—	@ —
Coke, bush.	—	@ —
COFFEE.		
Sandwich Id lb.	—	@ —
Costa Rica.	—	@ 12
Guatemala.	—	@ 12
Java.	—	@ 18
Manilla.	—	@ 15
Ground, lb.	—	@ 22 1/2
FISH.		
Salt to Dry Cod.	—	@ 6
do in cases.	—	@ 7
Eastern Cod.	—	@ 7
Salmon, bbls.	7 00	@ 7 50
Ht bbls.	3 50	@ 4 00
1 lb cans.	1 12 1/2	@ 1 22 1/2
Pick Cod, bbls.	—	@ —
Mackerel, No. 1.	—	@ —
Ht bbls.	8 50	@ 9 00
In Kits.	1 70	@ 1 80
Ex Mess Kits.	3 00	@ 3 25
Pickled Herring.	—	@ —
kg.	1 75	@ 2 00
Boston Smoked.	—	@ —
Herring.	65	@ —
Plaster, Golden.	—	@ —
Gate Mills.	3 00	@ 3 25
Lat & Plaster.	—	@ —
ton.	10 00	@ 12 50
Lime, Santa Cruz.	—	@ —
bbl.	1 25	@ 1 50

Leather.

[WHOLESALE]

WEDNESDAY, M., Feb. 14, 1883.

Sole Leather, heavy, lb.	30	@ 32
Light.	—	@ 28
Jodot, 9 to 10 Kil, doz.	30	@ 48 00
11 to 13 Kil.	—	@ 50 00
14 to 16 Kil.	—	@ 52 00
Second Choice, 11 to 16 Kil.	—	@ 50 00
Simon, Ulmo, Females, 12 to 13 Kil.	—	@ 50 00
11 to 15 Kil.	—	@ 50 00
16 to 17 Kil.	—	@ 50 00
Simon, 18 Kil.	—	@ 50 00
20 Kil.	—	@ 50 00
King French lb.	—	@ 85
Cal, doz.	—	@ 55 00
French Sheep, all colors.	—	@ 12 00
Eastern Calf for Backs, lb.	—	@ 10 11 25
Sheep Roans for Topping, all colors, doz.	—	@ 9 00
For linings.	—	@ 6 50
Cal. Russet Sheep Linings.	—	@ 8 00
Boat Legs, French Calf, pair.	—	@ 4 50
Good French Calf.	—	@ 4 00
Pest, dot Calf.	—	@ 4 75
Leather, Harness, lb.	—	@ 35
Fat Bridge, doz.	—	@ 45 00
Slitting lb.	—	@ 33
Wet, doz.	—	@ 30 00
Buff ft.	—	@ 17
Wax Side.	—	@ 19

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, Feb. 14, 3 P. M.

SILVER, 1.
GOLD BARS, 890@910. SILVER BARS, 10@18 1/2 cent. d's count.
EXCHANGE on New York, 30 premium; London, 49 1/2 @ 50; Paris, 5 1/3 francs \$ dollar; Mexican dollars, 57 1/2 @ 58; NEW YORK (4 per cent), 120 1/2.

Pacific Coast Weather for the Week.

[Furnished for publication in the Press by NELSON GOROM, Sergt. Signal Service Corps, U. S. A.]

The following is a summary of the rainfall for each day of the week ending 11:58 A. M. Wednesday, Feb. 14 for the stations named:

Date.	Olympia.	Portland.	Roseburg.	Cape Mendocino.	Red Bluff.	Sacram'to.	San Francisco.	Visalia.	Los Angeles.	San Diego.	Winnemucca.	Pioche.	Salt Lake.
Monday.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Tuesday.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Wednesday.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Thursday.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Friday.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Saturday.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Sunday.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Total.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

* Reports missing.

Lumber.

Redwood.

Rough.	@ 18 00	
Surfaced.	24 00	@ 30 00
Floor and step.	@ 27 50	
Merchandise.	@ 22 50	
Surfaced, No. 1.	@ 22 50	
Tongue & Groove 30 00	@ 27 50	
Pickets, rough.	@ 20 00	
do, fancy.	@ 30 00	
do, square.	@ 17 50	

At Reading, Pa., the sheet mill of the iron works has indefinitely suspended work, and 300 men are out of employment.

Oh, My Back!

That's a common expression and has a world of meaning. How much suffering is summed up in it.

The singular thing about it is, that pain in the back is occasioned by so many things. May be caused by kidney disease, liver complaint, consumption, cold, rheumatism, dyspepsia, overwork, nervous debility, &c.

Whatever the cause, don't neglect it. Something is wrong and needs prompt attention. No medicine has yet been discovered that will so quickly and surely cure such diseases as BROWN'S IRON BITTERS, and it does this by commencing at the foundation, and making the blood pure and rich.

Wm. P. Marshall, of Logansport, Indiana, writes: "My wife has for many years been troubled from pain in her back and general debility incident to her sex. She has taken one bottle of Brown's Iron Bitters, and I can truthfully say that she has been so much benefited that she pronounces it the only remedy of many medicines she has tried."

Leading physicians and clergymen use and recommend BROWN'S IRON BITTERS. It has cured others suffering as you are, and it will cure you.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE

Kentuck Mining Company.

San Francisco, February 6, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 34, of Ten Cents (10c) per share, was declared, payable on MONDAY, February 19, 1883. Transfer books closed on Tuesday, February 18, 1883, at 3 o'clock P. M.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine Street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, February 2, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 51, of Twenty-five Cents (25c) per share, was declared, payable on MONDAY, February 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WM. WILLIS, Secretary.

OFFICE—Room No. 29 Nevada Block, No. 309 Montgomery street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Navajo Mining Company.

San Francisco, February 2, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 6, of Twenty-five Cents (25c) per share, was declared, payable on TUESDAY, February 13, 1883. Transfer books closed on Wednesday, February 7, 1883, at 3 o'clock P. M.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill & Mining Company.

San Francisco, February 10, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 60, of fifty cents (50c) per share, was declared, payable on Thursday, February 15, 1883. Transfer books closed on Monday, February 12, 1883, at 3 o'clock P. M.

WM. WILLIS, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company

San Francisco, February 6, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 38) of Twenty-five Cents (25c) per share was declared, payable on THURSDAY, February 15, 1883, at the office of the Company, Room 19, No. 323 Montgomery Street, San Francisco, Cal. Transfer Books will close February 9, 1883, at 12 M.

JOSEPH H. NASH, Secretary.

G. H. BAKER,

410 Clay Street, - - San Francisco

PRACTICAL

Lithographer and Engraver.

Makes a specialty of Commercial Work, Maps, Ornamental Designs, Views, etc.

Agents Now Wanted.

Extra inducements will be offered for a few active canvassers, who will give their whole attention (for a while at least) to our business. Apply soon, or address this office, giving address, age, experience and reference.

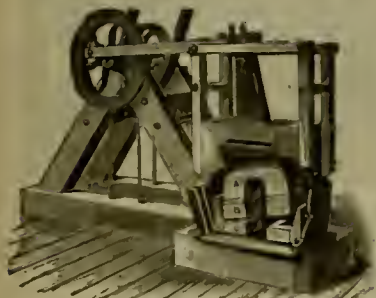
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No. 252 Market St., S. F.

MILL AND MINING MACHINERY.

F. A. HUNTINGTON,

No. 45 Fremont Street, - - San Francisco, Cal.

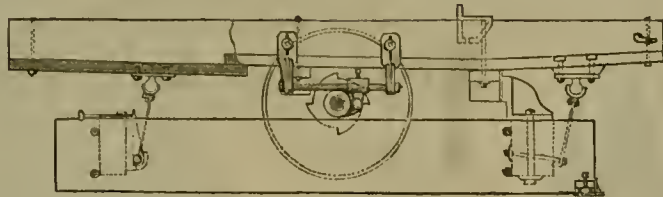


Oscillating Stamp Mill.

It has no Stems, Cams, or Tappets, and adjusts itself to the wear of the Shoes and Dies.
For simplicity, economy, durability and effective working, it exceeds anything ever presented to the public, and will do the work of five stamps with one-fourth the power. Awarded First Premium and Medal at Mechanics' Fair, S. F., 1880.

Manufactured by
F. A. HUNTINGTON, FRASER & CHALMERS,
45 Fremont St., S. F., Cal., 145 Fulton St., Chicago, Ill.
Improved Patent Grinding and Amalgamating Pans, Concentrators and Gold Amalgamators; also, Steam Engines and Mining Machinery of all kinds. Send for circulars.

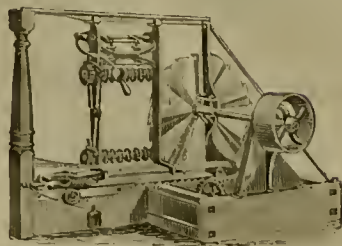
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45 Fremont Street, San Francisco, Cal.



PATTEN'S CONCENTRATOR.

This machine requires less power, less care and attention, and is less liable to get out of repair than any concentrator now in use. All of which any practical miner will comprehend when seeing it in operation.
The wear and tear is nominal, and the construction so simple that any miner can put it up and run it; and the low price brings it within the reach of all mill men, as it will save enough to pay for itself in a very short time. One machine will concentrate the tailings from a five-stamp battery.

Send for Circulars.



SHINGLE MACHINE.

For simplicity, durability and rapidity of action, these Machines have no equal, cutting from 3,000 to 4,000 per hour. They are now used by all the principal Millmen on the Pacific Coast.

SAWMILL MACHINERY,
Of all descriptions made to order.

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No. 45 Fremont Street, San Francisco

GIANT POWDER.

MANUFACTURED UNDER ALFRED NOBEL'S ORIGINAL AND ONLY VALID PATENT FOR NITRO-GLYCERINE POWDERS

All Nitro-Glycerine Compounds, for instance, so-called HERCULES, VULCAN, VIGORIT, NITRO-SAFETY Powder, Etc., are infringements on the Giant Powder Co.'s Patents.

THE GIANT POWDER COMPANY

Call Special Attention to their Improved Grades of Powder.

- NO. 1.—The most Powerful Explosive Compound now in use here.
- NO. 2.—Surpasses in strength any Powder of its class ever manufactured.
- NO. 3.—This grade is a Strong and Reliable Powder, which does excellent work.

JUDSON POWDER

is now used in all large Hydraulic Claims, and on most Railroads. It breaks much more ground, and obviates reblasting by breaking much finer. TRIPLE FORCE CAPS AND ALL GRADES OF FUSE.

The Giant Powder Company have also purchased from Mr. Nobel, the Inventor of Nitro-Glycerine, his latest invention, known under the name of

NOBEL'S EXPLOSIVE GELATINE

This explosive is from 50% to 60% stronger than the strongest Nitro Glycerine Compound and impervious to water. Even hot water does not diminish its strength. We are now introducing the same

BANDMANN, NIELSEN & CO., General Agents, 210 Front St., S. F.

L. C. MARSHUTZ.

T. O. CANTRELL

National Iron Works,

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MANUFACTURERS OF

IMPROVED PORTABLE HOISTING ENGINES

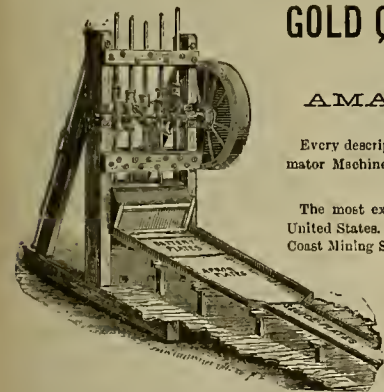
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HOME INDUSTRY! ALL WORK TESTED AND GUARANTEED!

Stationary and Compound Engines, Flour, Sugar, Quartz and Saw Mills. A large Assorting Machines.

CASTINGS AND FORGINGS OF EVERY DESCRIPTION.

Sole Manufacturers of Kendall's Patent Quartz Mills.



GOLD QUARTZ and PLACER MINERS'

Silver Plated

AMALGAMATING PLATES,
For Saving Gold

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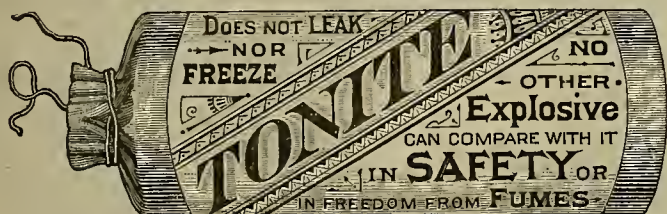
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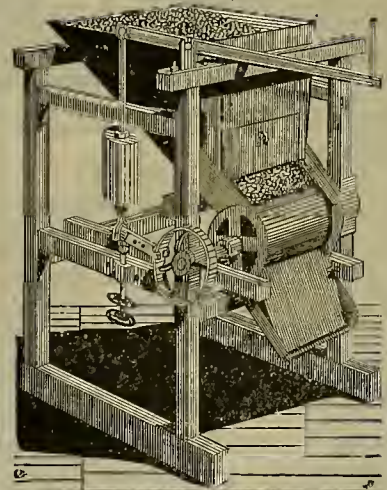
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In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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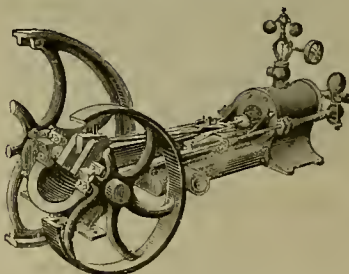
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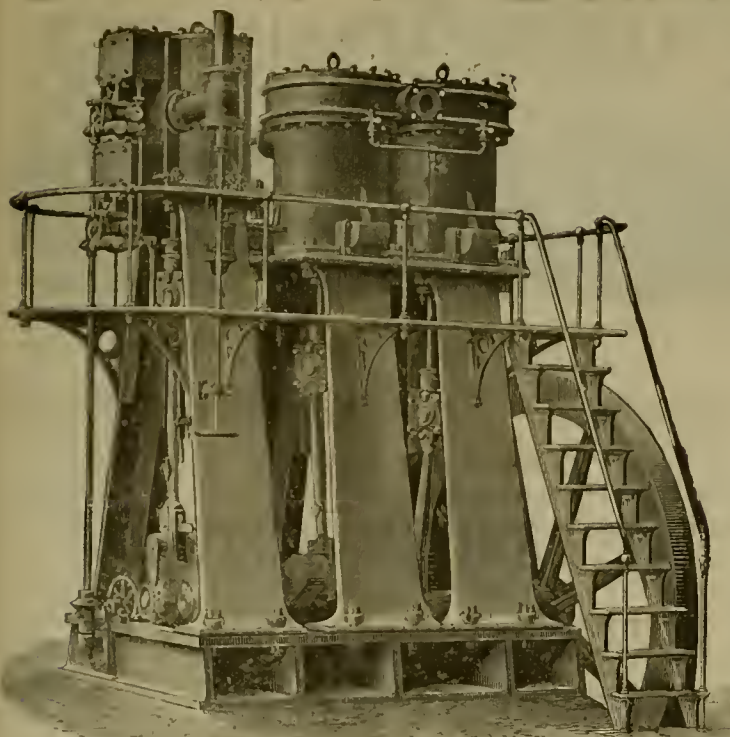
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SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

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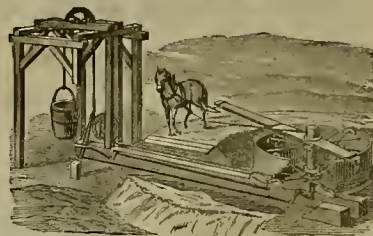
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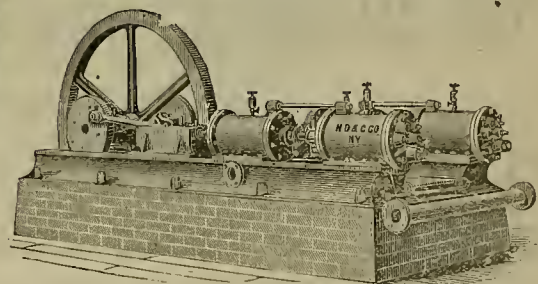
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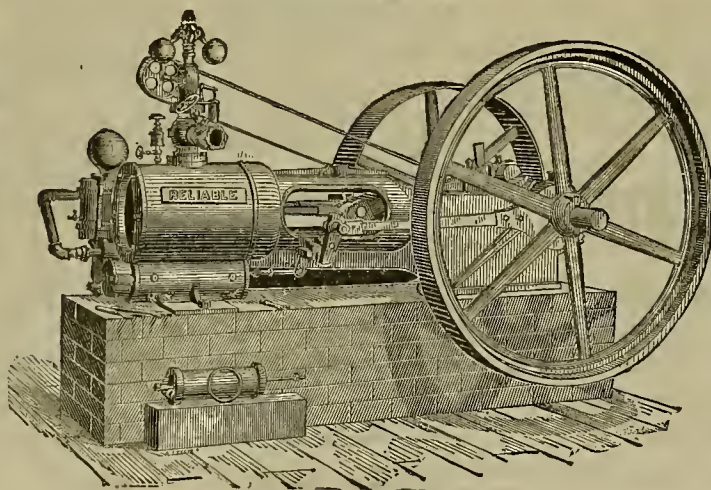
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(OVER 200 IN USE.)



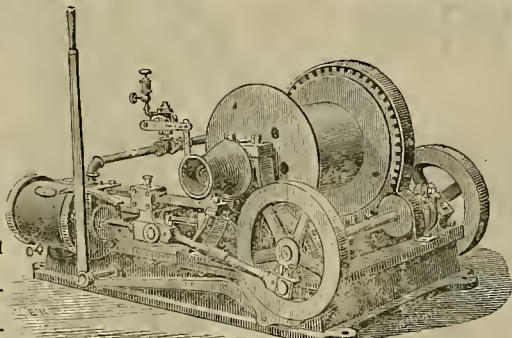
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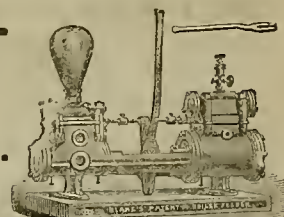
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More Than 16,000 in Use.



The Korting's Injector is the simplest, cheapest and best in use. Will draft its own water, hot or cold, and feed under varying pressure. Send for Circular.



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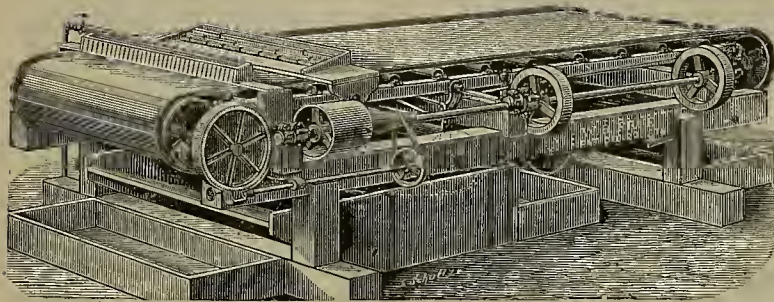
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Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order, and ready to make tests, at the office of Hinckley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

Room 7, 109 California Street, - - - - - SAN FRANCISCO, CAL.
Nov. 6, 1882

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HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

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No. 1 (XX) is the Strongest Explosive Known.

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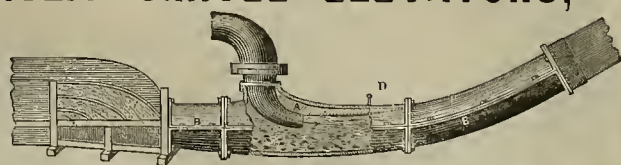
For working flat gravel mines that have no dump.

Suices gravel and water up hill on an angle of 45°, and will run any kind of gravel that will run in a flume. Handles rocks as easy as fine dirt, and will raise as much material as the water will carry off in a flume on 6 inches grade to 12 feet.

No bedrock cuts, tunnels or drains required. Machine a sufficient drain itself, and the process of mining the same as any other hydraulic mine. Is now a practical success in various places in California and Oregon. Send for descriptive circular to

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The Annual Statement of the Company of date, December 31, 1882, shows the following, viz:

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The Policies of the Company Impose

NO RESTRICTION UPON RESIDENCE OR TRAVEL.

Are Exempt from Execution and the Claims of Creditors,

—AND ARE—

Indisputable after Three Years.

This is the only Life Insurance Company organized in the United States whose Stockholders are by Law made Liable for all the Debts of the Corporation.

Active men of good character and ability wanted as Agents. Apply directly to the Company.

EMERY WHEELS and GRINDING MACHINES.

The Tanite Company.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

TWENTY-FOUR PAGE EDITION.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 24, 1883.

VOLUME XLVI
Number 8.

Auburn Quartz Mines.

Placer county quartz mines, for several years past shunned by mining capitalists, have, within the last six months, come out from under the cloud, and promise large returns during this year. In Auburn mining district are two classes of quartz veins, one in a slate country rock, the other in granite and porphyry. The veins in the slate have been found to contain occasional rich pockets, but no continuous ore bodies of any extent. The discovery of rich pockets at the surface led to the rapid opening and exploration of these mines, but the uncertainty and irregularity of the pay made mining at any great depth unprofitable. The quartz mines in the granite carrying the bulk of their gold contents in supposed rebellious sulphureted ores, and not readily obtainable by free milling process, were not worked to any extent or depth except in one exceptionable instance, and were considered, for the most part, of no economic value. Within the last two or three years they have been prospected and developed extensively, and to them the present, and probable future, prosperity of the quartz mining industry is due.

The Crater hill quartz mine, about one mile northwest of the town of Ophir, is the oldest, and thus far most extensively worked of these mines. The main shaft is down 800 ft. All ground east for 600 ft., and to a depth of 700 ft. is worked out.

In this part of the mine the first chute of ore was discovered. It was continuous, and in the several levels through which it was worked about 400 ft. long. It yielded in the aggregate about \$600,000. In sinking to the 800 foot level another ore body equally rich was encountered striking to the shaft from the west. This has been opened up during the last six months, and from every indication seems equal in extent and richness with the first-described chute. The mine is well equipped with steam hoisting works, and easy to work, the ground requiring little or no timbering, and the amount of water to be handled so small as to be controlled without difficulty. On the mine is a well constructed water-power 15-stamp mill. It will soon be started up, and will undoubtedly make a showing that will astonish mining men who believe this mine worked out years ago.

To the south and southwest of the Crater hill quartz mine distant a few hundred feet, are several promising mines. Most important of these, as the one on which most development

has been made, is the Gold Blossom. This mine was worked many years since and abandoned, the old mills not being able to work the ores which are heavily sulphureted. It was re-located three years since and several thousand dollars spent in prospecting and testing the rock. The results obtained being satisfactory, a sale was made by the local owners to some New York capitalists who have since sunk the main shaft to the 200 foot level, erected steam hoisting works, a 10-stamp mill with true and triumph concentrators, a large roasting furnace and made many other improvements. The mine has constantly improved as depth was attained, a much higher average grade of rock

ft. in depth, 500 ft. north of the first. Both of these shafts are in rich pay chimneys, and the ore taken out in sinking and drifting—very little ore being taken from the stopes has paid the cost of the shafts, a powerful steam hoisting gear on the first shaft, just put up, a ten-stamp mill and other improvements, and handsome dividends, in addition. The only capital invested by the owners was their labor, the mine having paid its own way from the start. The work already done has exposed a body of ore of great extent and high grade, the mill runs already made yielding from \$17 to \$50 per ton, and the mine will undoubtedly prove a bonanza to its owners.

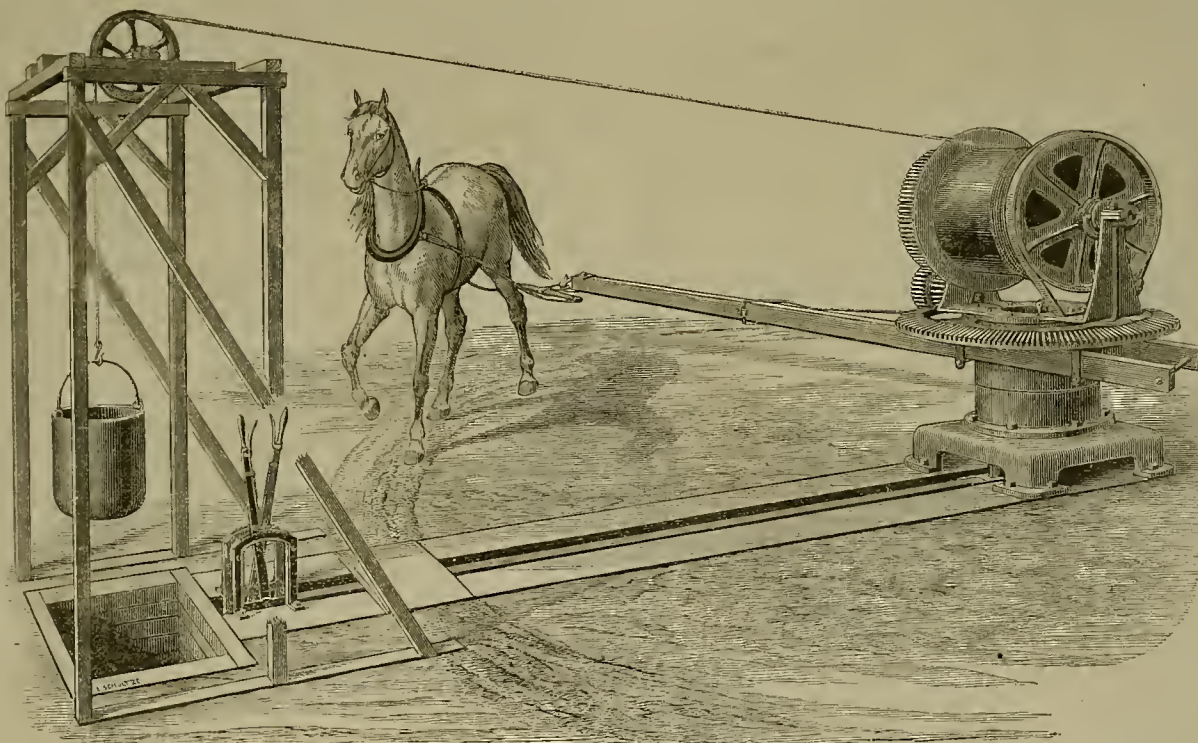
North of the North Star is the Belmont quartz

Baker's Mining Horse-Power.

No mechanical appliance plays so important a part in the first stages of mine development as the horse-power, it being in the most cases the prospector's main dependence until sufficient depth is reached to justify a steam hoist. Those familiar with the requirements of the kind of work are well aware that all machines generally made for this use are very crude in construction as well as unsatisfactory in operation. The machine illustrated in the accompanying engraving is the invention of Mr. C. H. Baker, a practical mechanic and miner of long experience, who has for many years been

studying the wants of the mining interests in this direction, with the result of giving us a most convenient and efficient horse-power, especially adapted for miners' use.

The advantages claimed for this power are as follows: The machine is made entirely of iron, and is therefore very durable and will not be affected by exposure in dry or wet climates. The hoisting drum is completely under control of the man at the shaft, landing the bucket by operating the levers at hand, and by which means the drum can be thrown in and out of gear at will, or the bucket lowered by the brakes as safely and conveniently as by a steam power hoist. The brake and clutch



BAKER'S HORSE-POWER FOR MINERS' USE.

coming from the bottom of the shaft. Only the ore containing the least percentage of sulphurete, is run through the stamp mill, it being found advisable to dry-crush the heavy sulphureted rock and roast before attempting to amalgamate. The mill commenced running on the 1st of February and the first clean-up has been very satisfactory to the owners, so much so that an addition of 10 stamps to the mill immediately is projected by the owners.

Two miles to the northwest of the mines just referred to is another group on which considerable work has been done during the past year. They are all situated on the same lode, which has a general northerly course and is the largest in the district. The first claim commencing at the south end is the Morning Star. This was like all the other important mines in the district, opened and worked 10 or 15 years since, and abandoned as worked out when the pay chimney was lost.

It was relocated four years since, and has been worked continuously ever since on the average, five men being employed. One shaft has been sunk 260 ft., and levels run from 70 to 100 ft. long, 50 ft. apart, and another shaft 130

mine, purchased a few months since by several San Francisco capitalists, who have made extensive permanent improvements on the property. The mine is opened by a shaft down 210 ft. The stopes at present worked are on the 150 foot level, the vein there averaging four feet in thickness. The ore is similar to that of the two last described mines, except that it carries a small per cent. of blue carbonate of copper (azurite), which is not found in any other mine in the vicinity. The rock is free-milling, the contained gold being as a rule very fine. A 10-stamp mill was completed, and commenced running about the first of February. The result of the first six days' experimental run under very unfavorable circumstances, yielded an average of \$10 to the ton. A very unfortunate occurrence at this time has temporarily shut down the mine and mill, and through the publicity necessarily given it, the mining reputation of the district has suffered considerably. In this connection it is well to state that the mine has been examined within the last week by experts of high reputation, who pronounce statements as to the failure of the mine as absolutely false, and the charges made against the former ownership and management of the mine are in no way whatever warranted by the facts. The mine is conceded not to have been fairly tested yet.

The Star claims that Tucson will soon have the finest streets in the Southwest.

levers are provided with spring latch and quadrant giving the man in charge freedom of movement when the brake is operated, and locking the brake so firmly as to prevent the possibility of accident.

The drum will carry 500 ft. of five-eighths steel rope, and, running horizontally, will take up and pay out without friction. The drum working independently, a pulley may be connected to the end of the drum shaft, and connected by belt to a crank shaft on gallow's-frame, by which a pump may be run continuously, without interfering with the hoist, as the drum clutch can be thrown in and out of gear while running. This machine will hoist one-third faster, and carry a heavier load than similar powers, thus giving it much more capacity for handling both ore and water when required. It is a very light, compact machine. At the ordinary speed of a horse, a 1000-lb. bucket of ore or water can be raised at the rate of 120 ft. per minute. Two or more horses can be used if desired. No piece weighs more than 250 lbs., thus admitting of its being packed on mules to all inaccessible localities. The cost of erection is slight, as two men, in half a day, are able to put it in place, ready for work. While this power is designed more particularly for mining purposes, it is equally adapted to all other uses where animal power is required. They are manufactured by the Pacific Iron Works, of this city.

CORRESPONDENCE.

Tuscarora District

EDITORS PRESS:—The old camp of Tuscarora is again coming to the front, and will "boom" during the coming year if prospects are any indication. The Navajo shaft is crosscutting for the ledge at 450 feet. The upper levels are producing fine sulphuret ore, containing a good percentage of gold besides the silver. The shipments are regular, amounting to from \$17,000 to \$18,000 per week. The Independence, under the same management, is also producing well; the ore is of the same character as the Navajo and worked at the same mill. The two are shipping \$100,000 per month, which is a good showing for a 10-stamp mill. The old Grand Prize has good prospects. The Argenta has good prospects; is worked through Grand Prize shaft. Elko Con. joins the Navajo; has two inclines, the deepest of which is 125 feet, with drifts on the ledge all showing the permanency of the ledge, which varies from six inches to 2 ft. of pay ore carrying both gold and silver, the walls are good and give every indication of being a true fissure. The country rock is porphyry. The Elko Con. shows two distinct ledges, one of which has not been prospected to any extent yet. The company intend erect hoisting works in the spring and sink a new shaft which will cut the main ledge at the depth of about 200 ft. They are now extracting ore and piling it up on the dump. There are various other good prospects here, among which the Tuscarora Tunnel seems to have a good showing. Other mining propositions will be heard from here, as Col. Dow has promised the use of his pen in giving you the mining news and developments of this valuable mining region. As the disadvantages of a camp should be spoken of as well as the advantages, I will say the main drawback here seem to be the scarcity or entire lack of fuel. Sagebrush has been about the only fuel used heretofore, and an alarm has been felt that the supply on hand was not sufficient to furnish the town for the winter, but during the fine weather of November the teams were all engaged bringing in immense quantities of brush, and the mining companies are now getting stone coal from Elko, proposing to use that in future. It will certainly be cheaper and better, particularly in winter, when the snow covers the brush, making it a poor article of fuel for steam producing. Mr. Dove has a foundry here at which many of the new parts can be made, thus encouraging home industry.

The Centennial district, 20 miles from here, has very flattering prospects. One mine, the Gray Eagle, owned by Mr. L. I. Hogle, of this place, not long since shipped four tons of ore to Salt Lake as an experiment. Cost of shipping, including all expenses, amounted to \$54 per ton, worked \$210, thus leaving the very gratifying result of \$156 per ton net.

L. L. W.

Saving Fine Gold.

The Snake River Placers.

EDITORS PRESS:—You may think strange of receiving a communication from this far-off point, but you need not. We are a live people, who have fought, bled and died in the good cause, and I read your very excellent journal with much satisfaction, as I do our Eastern mining journals, the *Record and Engineering*. But I have to ask questions sometimes, and thus far have failed to get responses, the reason, I presume, being want of knowledge from the fountain head.

You have an article in your issue of January 27th, "The Black Sand Question—Reason for Loss of Gold." The writer speaks of the loss of gold occurring by reason of oxide of iron, coating, etc. This may all be so in that particular locality. Now, there is a field, very extensive, covering some hundreds of miles in extent, on Snake river, in Idaho, which has been known to be rich in gold (placer ground), fine sand and free gold. There has been much work done and little gold saved. The same thing has been held as to the gold in this region. The magnetic sand, it was claimed, held the gold as rusty gold. Much money has been spent experimenting as to the best way of saving the gold contained in these Snake river sands. But all have failed, thus far, in establishing the fact that there is any gold contained in the magnetic or iron sands. While there is good ground for the theory in the case of Mr. Paul, in Butte Co., Cal.—coarse sand and iron—there is ample room for this condition of affairs, and there is no doubt it exists as stated, and there is no doubt but he can save the gold where it exists in that condition.

Others have experimented on the Snake river sands, but can find no such appearance of gold, as (rusty or oxidized gold) claimed by some. Now, can you learn from your many correspondents in Idaho, to what extent they have and are working the Snake river placer mines. Over 2,000 persons are and have been working those mines from above American Falls to below Boise city. Some companies have claimed to have made very big money; others sank big

money. Of my own knowledge, the gold exists free but fine, very fine. Shuicing will save but a small proportion of it; hence, the failure of so many to get returns satisfactory to them for their investments. The Castle Creek Co. have paid dividends the past year regularly. Holyoke Co., on equally as good grounds, I am told, do not. "Why is this thus." Could you throw some light on this subject of the extent of the placer mining of Idaho, why many succeed, others fail? You will be imparting information sought after by many capitalists who are anxious to learn something new under the sun—to them at least. I claim no gold exists as rusty gold in the iron Sierras of Eureka now, and no time should be spent, or money either, in trying to find any there; this much I am satisfied fully of. Another thing I am fully satisfied of, there are inventors who have machines working on theory, who are willing and anxious to palm them off as grand successes in saving fine gold, even floured gold; yet they will not test their machines practically on Snake river sands—enough, they say, to show the machine will save fine gold on other properties similar. How similar? You know, I know, they know it is lack of confidence in their machines to do all claimed for them with these particular sands. Yet they will sell their machines, take the money and ask for a certificate framed by themselves of its superior qualities, etc.

Gold exists in paying quantities in the Snake river sands, providing 80% of it can be saved; and once this is demonstrated beyond a doubt, you may look for a stampede for Snake river equal to anything California ever saw. Town-plot speculators would be thicker than sand hill fleas, and twice as unwelcome. Idaho would step to the front at once. Mr. Paul is undoubtedly doing good work in the direction he is now working, mainly here, to mechanically and cheaply extract the sands. This applies to Snake river particularly; then how to save the gold is the next problem. I have no doubt as to the latter; it can be done cheaply and rapidly. Give some light on Idaho placer mines, their extent, work done, product from them, etc.

Respectfully,

F. W. NOBLE,

Detroit, Michigan, Feb. 6.

Copper Mines.

Short Discourse on Common Sense.

A correspondent residing in Candelaria writes to us to ask: "What security have we that if we go ahead and open the copper mines of this region any one will buy them of us, or that we will ever be able to make anything of them?" What security, we would ask our correspondent, has the ranchman who starts in to cultivate a piece of land that he will ever get anything out of it? What security has the man who sends his boy to the best school he can find that he will prove a blessing to him in his declining years? What security has the man who goes into stock business with two or three cows and half a dozen old ewes that he will ever rear calves and lambs? All these questions of "shall I do this," or "shall I do that," are to sensible men, at the present stage of the game of life in this world, exceedingly silly.

The main thing is for a man to go to work and do something in earnest, and there is no danger of his coming to want. The man who lies back and growlingly asks all his neighbors, "Do you think I should do this or do you think I should do that?" is in nine cases out of ten a man who is trying to find some plausible excuse for doing nothing at all. Yet we will answer our correspondent according to the best of our ability and without putting ourselves out very much for a man who, we think, is not likely to put himself out very much for any living soul on earth, even including himself and himself tolerably hungry. We will say that copper appears to be in demand, just the same as silver, gold, lead, saw logs, potatoes, cabbage and almost anything else that a man not too lazy to work has a mind to produce.

Thus: The Calumet and Hecla Consolidated Mining Company will pay their regular quarterly dividend of five dollars per share on the 15th of February, aggregating \$500,000. Total of dividends to that date \$22,850,000.

The Quincy Copper Mining Company have declared a quarterly dividend of six dollars per share, payable on the 15th instant, aggregating \$240,000. Total amount of dividends to date, \$3,470,000.

The San Francisco Copper Mining Company have declared their regular monthly dividend of five cents per share, aggregating \$2,500, payable on the 20th instant. Total of dividends, \$25,000.

Let a man go to work earnestly at almost anything, using proper judgment, and he will not starve.

Means of making money are not half so much wanted in this country as common sense and a will to work.

A man who goes into copper mining is expected to have a grain or two of sense; he is no more expected to spend his time at work upon rock that has not enough copper in it to pay for working than a man is to take his thousand or two head of cattle out into an alkali desert and expect them to not only pick up a living, but also to grow fat.—*Virginia Enterprise*

Mining Surveys, and Surveying Instruments.

Considerable difference of opinion exists as to the best mode of making underground surveys, as well as to the instrument which is the most reliable. Accuracy is the great object to be obtained, and the reliability of a survey made with the loose needle and the chain, especially when the rails are laid down in the workings of a mine, has led to a great deal of discussion. Hedley's dial is a favorite with many engineers, being both compact and easily used, whilst others look to what they consider the more correct theodolite. But even with the fast or loose needle liability to committing errors, or owing to a defective dial, errors, in fact, will be greatly reduced by repeating the measurement two or three times over. So far as regards the loose needle, the system carried out and inculcated by Mr. Henderson, of Truro, appears to be about the best. A true magnetic bearing is taken at some point, for which all the other angular bearings are afterwards reduced to their true magnetic bearings. In working it is considered best to have what is known as a left-hand compass. Attached to the north end of the needle is a vernier, properly balanced at the other end, so that each angular bearing could be read with precision. If the compass is fixed in a certain position, and the bearing read in a backward sight, that bearing is read from the needle, whether such is settled in its true magnetic meridian or deflected from such meridian by local or other attractions. However, whatever deflection there may be, it is equal in both the back and fore sights, so that the difference of the bearings must give the angular bearings of the two drafts. This mode is adopted specially for the magnetic needle, whether such is under the influence of attraction or not. In using the dial, if every sight was taken and put down exactly to a part of a degree or moved the sight, an error having any parts of degrees would be avoided. In taking a sight in any direction, and the light was moved until it was exactly part of a degree, all errors would be avoided. In the North at times surveys are made with the compass, and not by taking triangles with the chain; and to ensure accuracy an object was placed at each end of the base line of the survey, with the compass in the centre, and the bearing of that line taken. If the two objects could be seen through the sight in one line, then it was certain that the compass sights were parallel. Sometimes, however, it was found that both objects could not be seen in the same straight line, and then, of course, it was clear that the compass was uncovered, and ought to be reflected. From the bearing of the line they could draw on the plan another line, which would be the meridian line for that compass, and if that compass was 20 degrees wrong, or any number of degrees, if the survey was made with the same compass, the survey could be laid down as correctly as if the compass was the most accurate one in the world, because whatever angle was made to the base line, it was carried on to the plan by the same wrong compass.

We are told by one of the most scientific engineers that there were many instances on record where the compass had been used skillfully, and works carried out mathematically correct with it. On one occasion, he states, he was sinking a shaft, and had to do the work as quickly as possible, because one of the upcast shafts had fallen in, and he had to erect a furnace and sink a shaft at the same time. The survey was done with a compass, and when he went to examine the work there was not half an inch difference between the center of the shaft and the center line of the furnace drift. In connection with the taking of observations, it has been pointed out that the weather at times might make some difference. In taking observations at different times, the weather might have been different on each occasion, and might, and probably did, have a tendency to cause a variation of the needle from the true meridian. This difference between the observations made on one day and that on another might be caused by the atmosphere, for oxygen, which was a component part of it, was a substance which attracted the needle. In making surveys underground the rails had an effect on the needle, and it has also been found that bricks, most of which had a quantity of iron in them, would attract the needle. The importance of accurate surveys cannot be overestimated, and as there are various ways of making them the engineer in gaining experience should be able to test his work so as to ensure its accuracy, and at the same time should endeavor to obtain the best, and consequently the most reliable instruments. To those who prefer the dial, Hedley's improved, or what is, perhaps, better known as Davis' improved Hedley dial, perhaps, he found one of the best. The theodolite is a good instrument, and as reliable as most others, although, perhaps, not so readily moved about. Care, however, should be taken to obtain one with the latest improvements and of the best make. A greater degree of exactitude, one engineer states, is obtained in reading angles with the ordinary dial than can be obtained by using either the fast or loose needle—to repeat the reading of the angle several times consecutively, the same as is done in using the theodolite. That gentleman is in favor of a good dial, which appears to be extensively used, not only at home, but on the Continent as well.—*London Mining Journal*.

[From our issue of January 27th.]

Of Interest to Miners.

During the next few months we intend giving to the readers of the MINING AND SCIENTIFIC PRESS a series of valuable illustrated articles of special value. Among these may be mentioned a series of articles now in course of preparation on "Timbering in Mines," which will be very freely illustrated. This will give the methods in vogue on this coast, as well as those commonly practiced elsewhere. A series of articles is also being prepared on "Blasting in Mines," which will also be illustrated. This will be of great practical interest, containing, as it will, many details of every-day use to the miners. It will treat of the various methods of preparing blast holes, blasts, etc., the tools used, the explosive agents and kindred subjects.

In addition to these articles, which will be continued through several numbers of the Press, we are preparing a special mining map of British Columbia, with a description of the geology of the region and of the mining districts.

A map of the mining districts of Alaska will also be given, showing the location of the quartz mines now being worked. It will also show the course of the Yukon river, where the recent finds of placer mines were made, and where it is expected some rich developments will be made next season.

We have, too, in course of preparation a map of some of the Montana districts, and one also of the various mining districts of southwestern Nevada, along the line of the Carson and Colorado railroad.

It is intended to more fully illustrate the Press than heretofore, and with appropriate engravings. Such of the mechanical appliances of mining or metallurgy as may be practical in their nature we propose to illustrate and describe from time to time as occasion offers.

It is the aim of the publishers of this journal to keep pace with the progress of the mining industry. The mountains of the whole western side of the continent are now hunted over by the adventurous prospectors. New mines are being found every day, and new works are being put up. The MINING AND SCIENTIFIC PRESS has kept track of this business for 20 years, and been with it in its ups and downs. Its best efforts have always been with the prospector and working miner, and will continue to be so.

It has been our object to cull from every source such things as would be of practical value or interest to the class of readers with whom we are identified, and these efforts have been appreciated, we trust.

The Press has the satisfaction of knowing that its columns have never been lent to bolster up any scheme to fleece unwary stockholders, and that it has persistently upheld legitimate mining. Now that legitimate mining is in the ascendant, we feel that we have done our share in the good work.

We can of course do nothing without the co-operation of the mining community. While already possessing among our subscribers a large proportion of the progressive miners of the coast, there are new men in the business who may not be familiar with the merits of this journal. To these others familiar should present its advantages and call their attention to the desirability of becoming subscribers. It will be a mutual advantage. The more full our patronage the better paper we can make. We trust these words will not fall unheeded, but that they will result in material addition to our lists. We feel no hesitation in presenting our claims, feeling as we do that it is but justice to ourselves to call attention to them occasionally.

ELECTROLYTIC PROCESS.—We understand that W. Butler Johnstone has received highly satisfactory information from Germany, relative to the electrolytic process of refining copper, gold and silver, about to be adopted at the Mammoth Smelting and Refining Works. A gentleman writing to him from Ocken, Germany, where the process is in use, says: "I have for three and a half years made a long series of investigations on the electrolytic process of separating coppers, and have described the result of them in an essay. In answer to your questions, I have to say: (1.) There are five dynamo machines at work at Ocken, made by Siemens & Halske, 10-horse power each, and there they refine annually, between 10,000 and 12,000 cwt. of copper. (2.) The process is extremely successful, both scientifically and pecuniarily. (3d and 4th.) The electrolytic separation of copper, mixed with silver and gold, is by far the most rational of all known processes. (5.) The required number of workmen is very small. (6.) A machine of 10-horse power precipitates in 24 hours in 12 connected elements (or pairs of plates), 300 kilos of copper."—*Salt Lake Tribune*

EXPLODING AND BURNING.—Dust mixed with air is found, by many sad experiences, to be, under certain conditions, a dangerous explosive. Thus, if a large log of wood were ignited, it might be a week before it would be entirely consumed; split up into cord wood, and piled up loosely, it would, perhaps, burn in less than an hour; cut into shavings, and allow a strong wind to throw them into the open air—or in any way keep the chips comparatively well separated from each other—and the log would, perhaps, be consumed in two or three minutes, but if ground up into fine dust or powder, and thrown in such a manner that each particle is surrounded by air, it would burn in less than a second.

MECHANICAL PROGRESS.

Two Sources of Damage to Boilers.

The *Locomotive* contains the following hints which should be carefully read: Leakage at the girth, seams and around the tubes of externally-fired, horizontal tubular boilers is one of the defects most often found, and one which is sure to become very serious in a short time if not attended to, for it induces corrosion in one of its most dangerous forms. There is nowhere to be found a better illustration of the truth of the old saying: "A stitch in time saves nine," than in this matter; and also no better illustration of the economy and value of proper care and management for steam boilers. Leakage at the seams of boilers may be induced by a variety of causes, of which we need mention here only two—bad workmanship and bad management. When the defects are due to bad workmanship the only help for it is, generally, to dress and re-caulk the edges of the plates. Sometimes, though not often, it will be necessary to cut out the old rivets, insert new ones, and then dress and re-caulk. This is also generally necessary, when a boiler has been overheated through shortness of water or otherwise. Sometimes too much lap is given the plate, when it becomes impossible to properly caulk the seams.

The writer has in mind now a certain rotary blower, whereon the plates lapped four inches beyond the rivets. The result may be imagined. Obviously the only remedy in such a case is to reduce the lap. Leakage is often induced by feeding cold water into a boiler, and delivering it close to the hot plates over the fire. Severe local contraction is thus caused, which no material can resist, and leakage is sure to follow. The solid plates of the shell are very frequently fractured in this manner. Where the use of cold water is unavoidable the boiler should always be provided with a circulating feed pipe as a means of economy and safety.

In too many cases, however, the seams are shaken by the habit, which prevails extensively, of pulling the furnace doors wide open without closing the chimney damper. This is a very common way of checking the generation of steam, when there is a lull in the demand for it from any cause, and cannot be too strongly condemned. The effect of a large body of air some hundreds of degrees colder than the furnace and boiler, rushing along the under side of the shell, is sufficient to loosen the best joint that ever was made, and in many cases it has fractured the shell through the solid plate. The effect of this is even more marked with some types of internally-fired boilers, such as the "drop-line," for instance, than it is with the common return tubular boiler.

Another fruitful source of damage to boilers and one which has ruined thousands, is the practice of blowing a boiler off and immediately refilling it with cold water, while the brickwork is red hot. Nothing will tear a boiler to pieces quicker than this. Boilers have exploded with disastrous effect from this cause, hours after the fire had been drawn. Probably most persons not familiar with the matter, would be surprised to know the pertinacity with which cold water will cling to the lowest point of a boiler under these circumstances. Local contraction of such severity is thus induced that nothing can withstand its effects, and a few repetitions are generally sufficient to ruin any boiler.

Comparative Strength of Yellow and White Pine.

A comparison of the relative strength of the two varieties—yellow and Norway pine—was made at Dayton, O., with the following results: Specimens were dressed exactly an inch square, and these were broken in a testing machine, by placing them on bearings one foot apart, with the weight in the center. The southern pine had been air seasoned for two years and upwards, the Norway about one year to 15 months. The weakest southern broke at 736 lbs., the strongest at 1,102 lbs.; average of 8 specimens of southern pine, 904 lbs. The weakest Norway broke at 501 lbs., the strongest at 790 lbs.; average of 10 specimens of Norway, 702 lbs., showing the southern pine to be 28.7% stronger than the Norway, and that a southern pine sill of 4x8 inches dimensions is equivalent to a Norway sill of 5½x8 inches, with the further advantage in favor of the southern pine, that it can be got much freer of knots, and consequently stronger in comparison than these figures show, which are based on clear timber. Another test was made at a meeting of the Master Car Builders' Association, with the following results: Five pieces of each variety, one inch square, and 11 inches between bearing points, were experimented upon, the pressure being applied in the center. The outcome showed strength of yellow pine at 500, 510, 500, 490 and 530 lbs. breakage strain, or an average of 506, while Norway stood a strain of 620, 645, 730, 650 and 630 lbs., or an average of 635 lbs. These experiments do not appear to throw much light on the question of relative strength, and unless it can be attributed to the difference in seasoning, it is hard to find a satisfactory reason for such a discrepancy.—*Wood Worker.*

Effect of Heat Upon the Structure of Steel.

Mr. C. H. Reed, of Johnstown, Pa., writes to the *Iron Age*, as follows, in regard to the effect of heat upon the structure of steel: In the course of an extended series of experiments to determine how far the failure of steel (which was chemically satisfactory) could be attributed to injuries inflicted by its first cooling from a melting heat, I was led to make the following experiment, which shows graphically the enormous changes wrought in its physical structure by changes of temperature alone.

Crucible steel having the following chemical composition, C, .80, Si, .189; P, .081, Mn, .27, was cast into an ingot about 1 inch square and 18 inches long. The instant the pouring ceased the mold was knocked off, and the ingot, with its interior presumably still in a fluid condition, was plunged into cold water and allowed to remain until perfectly cold. Observe that the interior of the ingot was hotter than the outside, a condition that could never be repeated, had it been allowed to become cool and then been reheated. The result was a very curious structure, which under test proved to be very hard, but not strong, being loose, brittle and worthless generally.

A piece about a foot long was broken off, placed in a furnace, brought to a bright-red heat, kept so for about 30 hours, and then allowed to cool gradually. When broken it proved tough, strong and soft. About all the mischief done by the original cooling had been repaired, but still it did not show the most satisfactory condition of which the metal was capable, or such an appearance as it would assume after being hammered or rolled. One-half of the 12-inch piece was therefore replaced in the furnace, and subjected to another long and careful annealing, the result of which was no gain in strength, but it was fine in grain with a silvery appearance, and the fracture would readily pass for that of a bar of hammered steel of good quality.

In view of the above facts, and bearing in mind also that steel in cooling from its melting heat shrinks 15-16ths of an inch to the foot, it is not to be wondered at that serious mischief is done, and that strains leading to internal rupture of the metal occur through hasty and thoughtless handling of steel from its fluid to its first solid state. And it naturally follows that the risk of doing harm is proportionate to the height of the temperature and the rapidity with which it is caused to fall, and that molecular changes due to thermal influences seriously effect the quality of the metal, and are entitled to more attention than they usually receive.

A MACHINE for printing box sides and ends instead of stenciling, and doing the work 10 times faster than can be done by hand, has been patented by Connell & Dengler, of Rochester, N. Y. It has the advantage of printing, in a very rapid and clear manner, all cards or trade-marks much more perfectly than can be done by hand, thereby rendering it of great importance to the merchant or manufacturer. The type or form is cast in brass, and secured in such a manner that it can be easily and rapidly adjusted to print upon the board at the proper time. The inking rollers can be instantly raised from the type to prevent inking when the machine is not fed with boards. It will print boards varying from one-eighth to one and a half inches in thickness, and at the rate of 1,500 to 2,000 impressions per hour. The boards or sides of boxes are introduced to the machine in quantities of 10 to 20 pieces at a time, and the bottom piece of the pile is fed by a reciprocating bar to its proper place, in order to receive the impression at the proper time, the boards above dropping down to be fed in like manner until all are printed.

LIFE OF A LOCOMOTIVE BOILER.—A locomotive boiler, it is calculated, says an exchange, will last until the engine has traveled over 350,000 miles. On some lines, however, the boiler, under favorable circumstances, particularly when pure water is used, may travel 400,000 or 500,000 miles before becoming unserviceable. Assuming that the life of the engine is determined by the endurance of the boiler, and that if, under favorable circumstances, it will last the 500,000 miles, then during that time it is estimated that the fire-box will probably require to be renewed at least three times, the tires of the wheels five or six times, the crank axles three or four times, and the tubes from seven to ten times.

A MINIATURE LOCOMOTIVE.—An ingenious mechanic of Jamestown, N. Y., has completed a perfect locomotive, said to be the smallest in the world, being only 8½ inches long. The pumps throw a drop of water per stroke. The engine weighs 1½ pounds, and the tender 2 pounds and one-half ounce, 385 screws were required to put the parts together, and the mechanic was at work on it at intervals for eight years.

AN IRON WATCH.—An interesting feature at a recent county exhibition in Great Britain was an iron watch which had been turned out by Messrs. Crowther Bros. & Co., of Kidderminster, for the purpose of showing the extraordinary malleability of their metal. The watch is said to be perfect in every respect.

SCIENTIFIC PROGRESS.

The Microscope in Testing Timber.

A paper was recently read before the Franklin Institute, Philadelphia, on the use of the microscope in testing timber, and it was decided that if the microscope condenses the sample, further delay in testing is not worth the while. The larger the specimen requiring to be tested, the greater will be the gain the microscope will effect in avoiding the cost of further proof or the risk of using without such proof. Samples and micro-photographs were exhibited of bridge timbers which had proved faulty, but which a preliminary examination with the microscope would have promptly thrown out. The timber from which these poor specimens were taken was a fragment from a railway bridge wrecked in 1879. The timber was so excessively poor that, on mounting a specimen on the plate of the microscope, its weak and porous nature was at once apparent. The annular rings appeared about three times as far apart as they would be in good wood of similar kind. The medullary rays were few in number and short in length, while in good wood, on the contrary, they are of considerable length and so numerous that tangential sections present the appearance of a series of tubes seen endwise, or a number of parallel chains. After once seeing and comparing samples of good and bad wood, it is easy to recognize the difference with a pocket magnifying glass. The trunks and limbs of exogenous trees, as is well known, are built up of concentric rings or layers of woody fiber, which are held together by radial plates acting like treenails in a boat's side. The rings, representing successive year's growths, are composed of tubes, the interstices of which are filled with cellulose.

The slower the growth of the tree, the thinner these yearly rings, and the denser and harder the wood—other things being equal. Not only is the closeness of texture an indication of the hardness and strength of the timber, but the size, frequency, and distribution of the radial plates which bind the annular layers together may be taken as a very close illustration or sign of the character of the wood and its ability to resist strains, especially a breaking stress. The micro-photographs of good and bad timber show that in the strong kinds the concentric layers are close in texture and narrow in width, and the radial plates numerous, wide, long and stout, while in poor stuff the opposite characteristics prevail. The practical application consists in having such enlarged photographic sections, longitudinal and transverse, of standard pieces of timber, bearing a certain known maximum or minimum strain, and rejecting any piece which the assisted eye detects to have fewer rings per inch of tree diameter, fewer fibers, or fewer radial plates per square inch of section, or to use such pieces with a greater factor of safety. The advantage of the method is that it allows every stick in a bridge or structure to be tested before use.—*North-western Lumberman.*

Increase of Weight by Combustion.

Prof. A. W. Hoffman, of Berlin, has recently described to the German Chemical Society a number of new and interesting chemical experiments, especially instructive for the lecture table. One of the most interesting and easily performed of the series is, perhaps that of showing the increase of weight by combustion, an experiment which can be rendered visible to a large audience in several ways. One of his methods is to draw a small magnet through a mass of iron filings, and then suspend it, with its load, from one end of the balance. After a balance has been thus nicely adjusted, set the iron on fire, when the increase in weight by the accumulation of oxygen will be at once made evident. The one of magnesium instead of iron makes the experiment much more brilliant. The weight of magnesium need not exceed 0.5 of a gramme.

A still more instructive experiment consists in burning phosphorus in a closed quantity of air. The conditions are also more favorable, from the fact that phosphorus gains twice as much to a given weight as either iron or magnesium. The experiment should be made in a flask, in the bottom of which a small quantity of sand should be first placed, upon which the phosphorus (say half a gramme) should be then placed and ignited by dropping upon it a small piece of heated copper wire. Of course the wire should be first used in adjusting the balance. The flask should be closed with a cork, which must be removed to drop the wire. The combustion in the closed flask takes place slowly and quietly, with a slight increase of pressure at first. The sides of the vessel will be covered phosphoric anhydride. No change of weight will be noticed until after the bottle has become cooled, and the cork removed to permit of the readjustment of the air pressure. Several other interesting experiments in the same direction are described.

HIGHT OF LAND AND WATER.—If the continents and the bottom of the ocean were graded down to a uniform level, it is estimated by geologists that the whole world would be covered with water a mile deep, so much greater is the depression of the ocean bed than the elevation of the existing land.

Action of Poisons on the Petals of Flowers.

A. Anthony Nesbit, F. C. S., states in the *Journal of Science* that he has made some experiments on the action of various substances on the life of flowers, and for this purpose selected some of the best known alkaloids, viz.: strychnine, solanine, digitaline, quindine, atropine, quinine, cinchonine, picrotoxine, aconitine, brucine and morphine, using one-quarter per cent. and one per cent. solutions. The alkaloid of tobacco being very difficult to obtain pure, owing to its rapid oxidation, 5% and 20% solutions of tobacco (bird's eye) were used in its stead. The flower chosen for experiment was the narcissus, and the results showed that there was here a wide field for long and patient investigation.

Of all the 12 solutions, tobacco proved, in a very marked manner, to be most destructive to the life of the flower of the narcissus; the remaining 11 poisons, though but slowly injurious, nevertheless in some instances showed marked difference of effect, or, it may be said, symptom. Thus strychnine, next in poisonous power to tobacco, drew the petals upward, and made them dry and brittle, symptoms also exhibited by solanine poisoning, while quindine and several other alkaloids rendered the petals limp and rotten. Morphine, one of the least poisonous (to the narcissus) of the alkaloids experimented with, without destroying the flower, curiously enough imparted to the petals a flaccidity resembling that of the petals of the poppy.

CHROME YELLOW.—This process is based upon the solubility of metallic citrates in alkaline citrates, and particularly in ammonium citrate. This property applies not merely to the metallic citrates, but to a number of other salts. Thus, in presence of an alkaline citrate baryta is not precipitated by sulphates nor potassium ferrocyanide by the ferric salts. The insoluble chromates are all more or less dissolved by ammonium citrate, and in general more in heat than in the cold. Zinc, chromate, among others, which is little soluble when cold, dissolves with great readiness when heated. Lead chromate, on the other hand, is dissolved with much more difficulty. On submitting to the action of steam a color composed of lead citrate, ammonium citrate, and zinc chromate, a lead chromate yellow is obtained almost as solid as that produced by dyeing. By the action of steam the lead citrate and zinc chromate dissolve in the ammonium citrate, and give by double decomposition zinc citrate and lead chromate, which is fixed upon the fiber. The author exhibited a swatch which had been soaped at a boil for half an hour. It may be foreseen that solid greens may be obtained by adding to the color alizarin blue.—*M. Jaquet.*

TIDAL AND OTHER WAVES.—The phrase "tidal wave" has lately come into use to a large extent, but, unfortunately, it is usually misapplied. The "tidal wave" is the wave of high tide which sweeps regularly around the globe twice every 24 hours. It is a wave which obeys known laws, so that its continual arrival may be predicted with unerring certainty. But this phrase has come to be applied to movements in the air or water, or in human life which are exceptionally abnormal, and which cannot be predicted. A revolution in politics which no one anticipated is called the tidal wave. Such movements are waves, but storm waves, not tidal waves. But "tidal wave" has a suggestive sound, and so its misapplication will probably continue.

OPTICAL TELEGRAPHY.—It is proposed to place the Islands of Mauritius and the neighboring island of Bourbon, in communication with each other by means of an "optical telegraph." The stations will be about 134 miles apart, and will occupy an elevated spot on each island. From either station signals will be by the aid of a petroleum lamp, be flashed across the intervening stretch of the Indian ocean to the opposite station, where they will be received by a telescopic apparatus, which it is proposed to arrange so as to photograph the luminous flashes. If successful, this system of signaling is expected to prove of especial value in sending warnings of the approach of cyclones.

NEW RECEIVING TELEPHONE.—A new receiving device for telephones has recently been invented which may be applied to both ears at the same time—it being slightly adjustable to fit different sized heads. With this improvement the entire sound is utilized, so that a message that might be indistinct or faintly audible with the ordinary form of single tube receiver becomes clear and loud when received through this improved instrument. This invention has been patented by Mr. George F. Dailey, of 304 East Eighth Street, Leadville, Col.

THE FIRST COMET OF 1883.—Mr. W. L. Burton, second officer of the steamship City of Savannah, reports the discovery of a comet at 2 o'clock of the morning of January 12th. The ship was on the way from this city to Savannah, and about 25 miles southwest of Cape Lookout. The position of the comet is indefinitely described as "southeast of Orion." The supposed comet, faintly visible by the naked eye, was observed the same evening as early as 9 o'clock, the ship being in the river below Savannah.

MARIPOSA.
FROM MT. BULLION.—Cor. Mariposa *Gazette*:
see in a late issue, an interesting letter which is
principally devoted to the mines on Sherlock's Whit-
lock's and Saxton's creeks, written by an old pio-
neer. Dr. L. H. Bunnell, who inhabited that section
at an early period. These references by Dr. Bun-
nell remind me of other mines of no lesser im-
portance, some of which lie near my "cabin door"
in Princeton, and others of value on the estate known
as the Fremont Grant. These mines are known to
be valuable, and have in former years produced a
vast amount of gold, but it seemed under the late
management as if it used the most extraordinary ex-
tractions to spend the stockholders money, without
yielding adequate return in any shape or manner. The
mines of the estate would afford a remunerative re-
turn to the stockholders, or its owners, if only a
proper management could be had. The estate is
rich in minerals, and it is to be hoped that at no dis-
tant day a revival of the mining interest will take
place, and that the original mines will be reopened
and put upon a paying basis. There are numerous
quartz veins upon the estate yet unexplored, known
to be valuable. The Princeton mine is one with
which the writer is and has been familiar for the past
25 years, having assisted in building the first mill
ever put upon it. It was worked with great success
under the management of Trevor W. Park, who ex-

tracted therefrom hundreds of thousands of dollars in gold, which first gave him a stroke for further speculation, that with his management, accumulated to millions afterwards.

MONO.

STANDARD CON.—*Bodie Free Press*, Feb. 20. There were extracted and shipped to the mills during the past week 1289 tons of ore. The bullion shipment was valued at \$17,477.60. The main east crosscut, 1000 level, was driven 15 ft; total length, 124 ft, with no change. The east crosscut from the south drift is in 30 ft; progress 16 ft, through very favorable looking rock, with some quartz. South drift No. 2 has been extended during the past week 22 ft; total length 295 ft, showing a vein 4 ft wide. Upraise No. 4 from the drift has been extended 20 ft; total height, 55 ft. The vein is 7 ft wide. The slopes show no important change.

BOHLE TUNNEL.—The pulp assays averaged \$15.95 during the past week. There is no particular change to note in the appearance of the mine. About 40 tons of ore are being crushed daily. The bullion shipments continue about the same as heretofore reported.

GREAT SIERRA.—The main tunnel is being pushed forward as rapidly as steam and muscle can drive it. As soon as spring opens a large force of men will be set at work.

THAYER CON.—The west crosscut from the north drift, 700 level, has been advanced during the week 10 ft, and is now in 40 ft. The rock continues hard.

KENTUCK SWIFTEWATER.—This mine is looking unusually good. The mill is crushing rich ore, and the bullion shipments are large.

SYNDICATE.—Prospecting in this mine is still in progress. It is expected the mill will be started up in a short time.

BEHULL CON.—The west crosscut on the 570 level was run 25 ft during the week; total length 177 ft.

NEVADA.

FORD & McDONALD MINE.—*Grass Valley Union*, Feb. 15: The striking of an under ledge in the Ford & McDonald mine, a few days ago, may prove to be a discovery of some consequence. The ledge in that mine in which a number of rich strikes have been made is found at the depth of 120 ft from the surface and lays quite flat, and in places disturbed. It has been a theory with Arthur McDonald, one of the owners, that there was another ledge below this, and some time ago he concluded to sink below the present workings to determine this. He therefore started a prospect shaft in the drift 150 ft distant from the working shaft, expecting to strike the under ledge in 10 or 15 ft. He was disappointed in this, however, but having confidence in his theory he kept at work until he sunk to a depth of 45 ft, when he struck a strong vein, two feet thick, which shows well in sulphurets and prospects in gold. This ledge has regular walls, and has a dip to the south of about 40 degrees, and looks as if it is going to be a strong and permanent vein. Arrangements for pumping or drainage will have to be made before this ledge can be worked, when further developments will be awaited with considerable interest by the companies owning adjoining ground.

PLUMAS

GENESSEE MINE.—*Greenville Bulletin*, Feb. 14: Dr. Quinn is getting ready to start his mill again with the return of mild weather; the power being had from an overshot wheel, cold weather causes trouble by the accumulation of ice. The mill is now full and ore enough is lying back in the tunnel to supply the batteries for two months. In the various levels there is ore enough in sight to supply 60 stamps for a whole season. The lower tunnel is run into the south hill a distance of 400 ft and from this drifts are run in different directions on several ledges, of which the entire hill is full, the principal one being 25 ft wide and the greatest depth yet attained in the workings is only 12 ft below water level. A never failing stream of water flows down the canyon in which the mine is situated. If this property were in the hands of parties who would work it so as to fully develop it a very large and a valuable mine would be opened up. There is such an immense amount of ore, the water and timber are so abundant, that in all probability some parties who can work it properly will be by and get a hold of it. Thousands of tons of ore can easily be got that will pay about \$12 per ton.

GREEN LEDGE.—About two weeks ago a force of men was put to work in this mine, it having lain idle for a long time previously. The tunnel has been cleared up and pay ore is now being taken out; the best ore has a copper stain and contains a small amount of sulphurets. Such rock is difficult to mill, but works very well in an arrastra, and at present is worked in that manner. The average value of the ore as worked in this way has been thus far \$30 per ton. The bullion is very fine, being worth \$19.50 per ounce. The men are now at work in a rich pocket in a drift below the tunnel.

CRESCENT.—The water has all been pumped out to the bottom of the shaft and men started in there to clear up the drifts on Monday morning. The shaft was found to be in good order after all the years it had been standing full of water, and but very little repairs were needed to fit it for being used for work. Twelve stamps are now running and more ore is being got than this number can crush, but the scarcity of water will not admit of starting up more until after storm comes.

WATER.—The long expected storm came on Monday night; during the preceding day or two the wind set in strong from the south and it was evident that a heavy storm was brewing. Rain mixed with snow came down in a good steady pour that gives promise of long continuance; already the streams have risen considerably and from the mountain sides little streams that will soon be torrents are pouring into the reservoirs at Round valley. It is fair to presume that all danger of a water famine is now at an end.

NEW TUNNEL.—A new tunnel has been started on the west side of the hill from the Taylor-plumas mine and near the Stampfli ranch. The claim is owned and the tunnel run by Martin Fritsch, John P. Martin and Adam Hoffman. The entire ridge is believed to contain valuable quartz veins.

TUOLUMNE.

CONCENTRATORS.—*Tuolumne Independent*, Feb. 17: The Patterson M Co. have added sulphuret concentrators to their mill. These are built by Seebor, after pattern of the Schofield, and are thought to be

the best and most natural way of saving—being carried through long spouting boxes, with a slight grade—a stream of water frees them from the sand and they are thus made clean. Heretofore the sulphurets have been allowed to run off down the creek—but as depth in the mine is attained they become more abundant in the ore and of better quality which makes it a profitable object to save them.

It is contemplated putting an additional force of 25 men on the Riverside mine next month, or as soon as accommodations can be furnished in the way of a large boarding-house—the lumber for which, we learn, has been ordered. Work will begin on the building as soon as the material is received.

Nevada.

WASHOE DISTRICT.

POTOM.—*Virginia Enterprise*, Feb. 18: Since last weekly report the main south drift has been advanced 65 ft in the same course. There has been no change of any importance in the character of the ground passed through, nor any increase of water. The face of the drift is still dry. The machinery is all in good order.

SIERRA NEVADA.—The main north lateral drift on the 2900 level has been extended 25 ft. The joint Union Con. east crosscut on the 2900 level has been extended 26 ft, passing through stringers and bunches of quartz giving low assays. The face is now in porphyry.

OPHIR.—A joint Mexican fan station is being cut out at the 2900 level. Have completed the work of putting guides into the second compartment of the joint Mexican winze from the 2900 down to the 3100 level. On the 1000 level are repairing the drain tunnel leading out from the main incline to the Suro tunnel.

UNION CON.—The joint Sierra Nevada east crosscut on the 2900 level has been extended 26 ft, passing through stringers and bunches of quartz giving low assays. The face is now in porphyry. The joint Mexican east crosscut on the 2900 level has been advanced 20 ft.

MEXAN.—A fan station, joint with the Ophir, is being cut out on the 2900 level. Have completed the work of putting guides into the second compartment of the joint Ophir winze from the 2900 down to the 3100 level.

SURO TUNNEL.—The main force has been employed in the tunnel between points 4,000 and 7,000, making general repairs. Flow of water equal to 7,626,010 gallons per 24 hours.

COLUMBUS DISTRICT.

NORTHERN BELLE.—*Candelaria True Figure*, Feb. 17: A crosscut has been started from the bottom of the main winze from the fifth shaft level. It runs toward the foot wall of the ledge found in the shaft, and has been extended 14 ft. The face of the crosscut has several spots of sulphurets, from which good assays are obtained. The slopes on the fifth shaft level are yielding a small quantity of high grade sulphurets. The ore body in the slope from the fourth shaft level has increased in width somewhat, and continues to produce the usual quality of ore. There is a material improvement above the first shaft level where the ore is entirely free from the slate, which has been troubling considerably during the past two weeks. But 55 tons of ore have been delivered to the mill daily during the week, owing to the cleaning out of the ore chutes preparatory to working a quantity of ore for Messrs. Farrington Brothers. The bullion shipments were \$15,208.78 for the week ending February 15th, and a total of \$32,416.15 has been made on February account to the same date.

MOUNT DIABLO.—The slope above the drift connecting winzes No. 1 and 2 shows a small amount of \$90 ore. A ledge of low grade ore, 4 ft wide has been developed in the slope from winze No. 2. This ledge carries about 18 inches of ore assaying \$70 per ton. The intermediate drift, west of winze No. 1, and below the third level, has encountered a 2-ft ledge of \$50 ore. Some \$90 ore is being extracted from an irregular ledge at a point near the head of winze No. 2, on the third level. The slope above the west drift on the third level, shows a foot of \$70 ore. The intermediate slope, above winze No. 4, is showing a small amount of ore assaying \$75 per ton. A small amount of \$200 chloride ore is being taken from the intermediate slope, above winze No. 1, and between the second and third levels. The slope above the west drift from the Callison winze shows some 18 inches of \$85 ore, that looks encouraging. Considerable \$75 ore is being stoped at various points in the intermediate drift below the first level, and the Tipton ledge continues to yield a small amount of \$80 ore.

COLUMBUS CON.—Connection between the first and second levels has been made by means of the raise from the second. This secures ample ventilation, and allows the work in that part of the mine to progress more rapidly. Several tons of good ore are being extracted from the slope west of the winze on the second level. The south crosscut from the west drift, on the same level, is in 17 ft, its face showing a favorable formation. No change has been developed in the raise from the west drift on the first level.

CRABB DISTRICT.

MILLING ORE.—*Esmeralda Herald*, Feb. 17: A correspondent writing from Crabb District says that owing to the late cold snap, there has been but little prospecting done in the district for some time. He denies the report that the bottom has dropped out of the Eagle Bird mine, and says that in the lowest workings of the mine there is good milling ore. The Messrs. Plummer have struck a good prospect about 6 miles north of Crabb.

ESMERALDA DISTRICT.

CLOSER DOWN.—*Esmeralda Herald*, Feb. 17: The Cortez mine was closed down last Wednesday evening and all of the miners discharged. There are a few tons of ore and tailings yet remaining at the mill which will be worked ere the stamps are hung up. After a two months trial it has been determined that the ore of the Cortez is so low grade that it cannot be worked even at a small profit. This event coupled with the present anxiety felt and existing over county seat affairs, has cast a gloom over the people of this place who were just beginning to dream of the long wished for boom.

INDIGNATION MEETING.—The Miners Union held an indignation meeting Friday. The Cortez Company proposed, through their Superintendent, to give the men due bills for the wages incurred in February. On inquiry due bills were not negotiable with any of the monied firms here, and in consequence the men

would not accept them. We understand that everything was finally settled amicably, the company paying the men at a discount.

EUREKA DISTRICT.

STRIKE IN EUREKA TUNNEL.—*Sentinel*, Feb. 18: A strike was made yesterday in what is known as the "Sullivan chamber" of the Eureka Tunnel, some 60 ft below the tunnel level. The face of the drift is all in ore, which extends below, above, and on both sides, for a distance of 6 ft in. It has not been explored sufficiently to determine what its extent will be, but the indications are favorable for its development into a considerable body. Two assays made from the new find go \$125 and \$150 per ton. The ore is of the character common in the mine, and has frequently been described. We learn from Gen. Connor that the mine is looking remarkably well generally, and that ore has been found in several other places, with favorable indications for prospecting. The flattering condition of the Eureka Tunnel, and its almost continuous improvement, are very pleasant to record, because it strengthens the assurance that this mine is one of splendid possibilities, while it strengthens the belief entertained by miners in the camp that Prospect Mountain is likely yet to compete with Ruby Hill in the production of the precious metals. Every improvement in the Eureka Tunnel is a substantial encouragement to all who own mines or are prospecting in that quarter.

FLOWERY DISTRICT.

THE MONTE CRISTO MINE.—*Virginia Enterprise*, Feb. 17: This well-known property will soon be producing bullion again and giving employment to many hands now idle. William Rodder, formerly pumpman at the Utah mine, has obtained a contract authorizing him to take ore from any point above the 600 level, he paying to the owners a royalty of so much a ton for the privilege.

MT. CORY DISTRICT.

LIVELY.—*Esmeralda Herald*, Feb. 17: A gentleman who visited this new mining district a few days ago informs us that things look lively and the prospect promising for a flourishing town of several hundred inhabitants within a few months. As soon as the road from Hawthorne is completed, lumber for buildings will be rushed in as fast as the teams at command can haul it. The mines are looking very well, and encouraging developments are being made. People from all parts of the State are coming in daily.

SILVER GLANCE DISTRICT

RED ROCK.—*Reno Gazette*, Feb. 14: Marshall Willard came in with some very rich rock from the Orpheus mine, which is located about five miles from the Ventura mine, in the direction of the Sweetwater mountains. Mr. Willard has a shaft down 130 ft, developing a 2-ft vein of quartz that yields from \$40 to \$50 per ton, though some has worked as high as \$130, with copper plates alone as the saving process. The country in that vicinity is full of mineral. Some of the richest float ever found in that very peculiar mineral belt has been picked up near the Orpheus. Mr. Willard has a five-stamp mill at work—a little prospecting apparatus that will crush only about a ton in 24 hours, but he is now making arrangements to put up a mill with a capacity of 7 or 8 tons a day. The Orpheus will probably be heard from as a bullion producer next summer. Unlike many other mining ventures, it has paid its way from the start, and there is money in the pot.

TUSCARORA DISTRICT.

BELLE ISLE.—*Times-Review*, Feb. 15: Drift north, 350-ft level, extended 25 ft. Formation more favorable for ore, and the vein shows an improvement. Work elsewhere in the mine progressing as usual.

ARGENTA.—The west drift from bottom to winze is in 52 ft, and a crosscut has been started for the foot-wall.

GRAND PRIZE.—The west winze below the 600-ft level is 31 ft deep. North crosscut on 700-ft level is in 125 feet, and south crosscut from face of the west drift is in 25 ft, in favorable looking ground. The flow of water is gradually decreasing.

ELKO CON.—During the past week the main drift of shaft No. 1 has been advanced a distance of 8 ft. The ledge continues in ore of a fair quality. Crosscut No. 1 has been advanced 6 ft through a formation composed of porphyry, spar and quartz. The spar and quartz are of a very encouraging nature.

NAVAJO.—The 300-ft level drift south, on the east lateral vein, has been extended 11 ft; total distance, 92 ft. Slopes on this vein and level show considerable improvement. Slopes on the different levels on the west vein are looking well at all points. Everything running smoothly at the mill. Average of ore milled during the past week, \$227.99 per ton.

Arizona.

WALKER DISTRICT.—*Prescott Courier*, Feb. 15: Walker mining district, 8 or 10 miles from Prescott, has now 200 men at work, opening mines, putting up houses and machinery, getting out timber, burning charcoal, etc. Our friend Waldemar is going over there to start and run a barber shop.

RICH STRIKE IN SOUTH PIONEER.—*Globe Chronicle*, Feb. 14: W. E. Spence, who returned from Pioneer Camp Thursday last, informs us that the last strike in the South Pioneer mine exceeds any of the previous discovered ore bodies in richness and size. The strike was made near the 300-ft level and is several feet in width, the ore being polybasite, carrying a large percentage of native silver.

In the Howard mine they are stopping at about the same depth that the new strike was made in the South Pioneer.

Work is being vigorously pushed forward in all the principal mines in the camp.

The new road from Casa Grande, on the S. P. R. R., to Globe, just finished, passes through the camp, the time from Casa Grande to Pioneer being only about 12 hours.

SMELTER.—The Long Island smelter shut down Tuesday morning for repairing and to await the arrival of coke en route from Wilcox. Work is being vigorously pushed at the mines with a view of getting a large reserve of ore ahead. There are 62,000 pounds of copper bars at the smelter awaiting shipment to the railroad by Stevens' teams, which are now discharging their cargo of 85,000 pounds of coke for the same company.

Supt. W. B. Devereaux, having thoroughly overhauled and refitted the old Carrie smelter, started it up last Thursday morning, on ore from the Tacoma Company's excellent mines. This makes the fourth large company whose smelters are in successful operation in our camp.

Colorado.

MENDOTA LODGE.—*Colorado Miner*, Feb. 10: Last week Wednesday Mr. R. O. Old shipped a carload of ore from this lodge to the Golden Smelting Works. The lot weighed a little over 10 tons, and returned 55 ounces in silver and 60% lead per ton. The gross value of the lot was nearly \$1,000. It came from level No. 1 east, on Beck and company's leased ground. The pay streak is solid and over 3 ft wide, of which about one-half, however, contains considerable zinc and is not shipped at present, but it will be. We understand that Messrs. Beck & Co. are about to double their present force of six men and put on a night shift. Mr. Old is preparing to start his long-meditated tunnel, which will cut the lodge 450 ft deep in a distance of 730 ft. Mr. Old shipped another carload of ore from the mine on Wednesday of this week, and expects to ship five cars during the present month. The grade of the ore has shown decided improvement for two months past.

Idaho.

BANNER ITEMS.—*Idaho World*, Feb. 10: The Elmhurst Silver Mining Company is working only three men this winter—running an upraise, which will connect the shaft that was sunk last fall, with the lower tunnel. This tunnel was run in 875 ft last fall and struck the ledge 80 ft below the shaft. Two veins were crossed, and instead of being a split in the ledge or two veins of the ledge, one on the hanging wall and the other on the foot wall as at first supposed, it is my opinion that they are separate veins. The tunnel was run on the first one, which dips toward the south, and the raise is running up on the inner one, which dips to the north. The raise is now up 50 ft and still the vein keeps its course. When the raise is up high enough a drift will be run south to strike the shaft. I have sent you some of the rock that was taken out of the ledge last week. It is about an average. The width of the ledge is from 6 to 18 inches. We had quite a cold snap here. Quicksilver lying on the mill floor froze so that it could be rolled about like balls of lead. We are now having some more weather like it. There is fully as much snow here now as last winter. It measures 8 ft. Several assays have been made of ore from there that went from \$200 to \$1,350 per ton. A district will undoubtedly be opened up there next spring that will astonish the natives.

Montana.

NOTES.—*Inter-Mountain*, Feb. 12: Energetic operations continue on the Clear Grit, and recent developments in the west drift have exposed an immense body of workable copper-silver ore. The ledge will soon be tapped in the 500 level of the Lexington.

The mammoth machinery of the Anaconda, which is the finest in the world, continues to run like clock-work.

The Granite Mountain mine at Philipsburg is producing handsomely and is said to be one of the richest silver mines in Montana.

It is reported that the Union Pacific Co., will soon reduce the tariff on milling salt to 15¢ per ton, which will still be \$7 more than that on coal. Fifteen dollars per ton, however, would suit the mill men.

New Mexico.

LAKE VALLEY NOTES.—*Herald*, Feb. 10: The Superior is working 20 men now, and the Bullion 11. The Germania mine, two and a half miles southeast of Kingston, is showing up a well defined vein, carrying galena ore.

G. W. Gregg reports the Cave Creek properties as showing well. The ore is in large bodies, in true fissures, and of high grade.

Mr. L. Stubenrauch, discovered this week the Bonito ledge between the Superior and Solitaire, and covering the same contract vein. He will commence work immediately.

The representative of the Studebaker Bros., South Bend, Ind., went up Sunday to examine the Solitaire, and probably to complete the negotiations in progress for the sale.

Mr. J. E. Roberts purchased this week two very promising properties near the head of the Animas river, about 12 miles from Kingston.

Mr. Webster, one of the pioneers of the Carpenter district, southeast of Kingston, came in Monday night for provisions, etc. He is working four mines, namely the Ohio, Carpenter, King and Queen. They are all fairly developed, and show heavy bodies of galena ore with some gray copper averaging 40 ounces silver per ton and 40 per cent lead. There are several other good mines in this district.

Utah.

TINTIC.—*Cor. Salt Lake Tribune*, Feb. 17: One of the most promising mining districts in Utah is that known as Tintic. The construction of the Salt Lake & Western R. R. from Lehi to the heart of the district has made it possible to work the mines and reduce the ores at a profit and conduct operations on an extensive scale. The owners of properties there are making preparations for turning out large quantities of metal, and the whole district will soon become one of the liveliest on the coast. The iron mines around Silver City are being worked at a profit to the owners, and bid fair to become one of the leading mining interests of the district. The prospects throughout the south end of the district, at and around Diamonds are being worked by the original locators, who for 10 years have remained by them, and their faith is not diminished as to the value of their claims. Throughout the camps there is a hopeful feeling, based upon the assurance of a prosperous year. The varieties of the ores in the district are greater than heretofore supposed, and, with the introduction of the new works in progress and contemplation, Tintic must assume a prominent position among the many precious metal-producing districts of the West.

PARK CITY.—There is no uneasiness felt here in regard to the failure of the Ontario Co. to pay the regular monthly dividends. Their object in discontinuing them has already been stated in the columns of the *Tribune*. We do not think this will have any bad effect on the camp, but, on the contrary, the increase of machinery and capacity will naturally create a demand for labor, which will in turn prove a benefit to our merchants. Regarding the Utah Eastern purchase by the Ontario Co., we believe that in this event a decided improvement would be made on the road, in the way of rolling stock, buildings and its capacity. The silver bars are shipped daily, as usual, notwithstanding the fall in the price of Ontario stock.

The Inyo Range.

Rich Mineral Deposits of a Remote Region.

The railroad which is being extended through outworn Nevada down into and through Inyo county will aid in developing a very great extent of mineral country. The Inyo range is particularly interesting in this respect as a large proportion is as yet but partially prospected. The volcanic origin of these mountains is evidenced by craters whose scarred rims are yet white with the ashes of dead fires. The Arnagosa, Argus and Telescope ranges are the most imposing of these mountains. The Inyos extend along the Owens Lake valley, from its eastern rim and the White mountains in Nevada southward, for a distance of 150 miles, parallel with the Sierra, from which they maintain an average distance of about 12 miles. They rise and fall in waving lines, gradually ascending until the loftiest summit is reached, opposite Mount Whitney, where they tower 10,000 ft. above the sea and over 4,000 ft. above the valley. A correspondent of the San Francisco *Chronicle*, not long since, wrote a very interesting letter describing the region under consideration, and from that letter we make some quotations:

Characteristics of the Range.

Though seeming to scorn connection with the Sierra, they have sent out to their base an offshoot of low hills called the "Alabamas," a line of skirmishers thrown across the river and set as a defense, challenging the encroachment of the Sierra upon the lowlands below—a curious group of hills rising like volcanic bubbles along the Sierra's sloping base. The rock formations of the Inyo range, having for their fundamental bed the eternal granite, are divided into slate, limestone and porphyry, stratas of which cut the surface in great parallels, or bold undisputed possession of vast districts. Its deposits run through all characters and grades, from the native metals to the purely chemical deposits. These are distributed with wonderful prodigality. Like all mining regions, the range has been divided into districts, which, though bounded by imaginary lines, have a character and nature peculiar to themselves. Following the range northward, these districts are divided as follows: Cerro Gordo, Russ, Beveridge, Union, Waucoba, Big Pine, Deep Springs, Bishop Creek, Piute, Sylvania, Montgomery and Indian Queen.

Cerro Gordo.

In Cerro Gordo, the southernmost district, lying abreast of the lake, vast dykes of limestone, slate and syenite cleave the rolling hills, into which the lower mountains unfold, alternating as they ascend toward the central mass, until the upper altitude is held by a vast limestone formation. In this, at the town of Cerro Gordo, 8,000 ft. above the sea, and 4,000 ft. above the lake, and lying at the base of the Cerro Gordo peak, was found the most extensive lead and silver deposits yet developed in the entire range, or in the State of California. From them have been extracted \$15,000,000. The extraction of ore from these deposits is at the present time suspended, though undoubtedly millions still remain to be uncovered, as the development of these deposits are of the most superficial character.

A Singular District.

The district lying to the north, and known as Beveridge, is one of the most remarkable mining regions in the world. It has features common to no other part of the range. The varicolored limestones which enter so largely into the structure of the range in Cerro Gordo, and which there tower in cliff, precipice and summit, are here beaten down from the occupation of upper slopes, and give place to granite. The limestones in this district form the flanks of the mountains, and do not, except in rare instances, rise in height above 4,000 ft, while the granite towers to over 10,000 ft, and forms the body and breadth of the higher altitudes and slopes. It does so, however, not without contest, for at several points are seen mighty peaks of lime that lift themselves toward the sun. The mineral of this district is gold. The lead, silver, copper and the various rare and peculiar metals found in other parts of the range are entirely absent in this granite formation, though they are met with in the bordering limestone. The ledges of quartz are exceedingly numerous, each ridge and canyon side being pierced by them.

If future operations shall trace these gold veins to the mountain's heart, giving them scope and permanency, this district will become one of the most wonderful gold-producing regions ever known. Although sufficient has been discovered to attract interest and attention, the roughness of the country has retarded development and prevented extensive operations. No part of the district is penetrated by wagon roads. Rocky trails alone, clinging in places to the face of tremendous cliffs, and overhanging giddy depths barely wide enough to receive the feet of the patient mule and burro, lead into this mountain fastness. As a result, but a single five-stamp mill has been erected in the entire district, and that with infinite toil was packed in sections by mules. This mill, though running for a part of the time only for the last two years, has produced several hundred thousand dollars, and this almost wholly from a single mine still in operation.

Other Districts.

The mining ventures at Chrysopolis, San Carlos and Mazourka canyon are historical, and woven into the early history of this section.

Northward the Inyos spread into a mass of milder forms, and open into a region less marked with the aspect of desert mountains. The savage ruggedness of Beveridge softens into broad and rolling uplands redeemed by forests of pine. Here, and reaching to the White mountains, are situated the remaining districts heretofore mentioned, where the base and precious ores are found in sufficient quantities to make these districts the arena of considerable mining enterprises. In Waucoba, the first district north of Beveridge, the high grade silver bearing lead ores predominate, and in instances give promise of permanency and richness. Streams of water, forests of pine, deposits of soda, salt, iron and lime are near at hand for the process of reduction, which will reduce the cost of mining to the lowest figures.

Saline Valley.

Standing upon the summit of the eastern slope and looking toward the east, but down, until the senses swim with the awful depth and distance, is seen Saline valley, stretching along the base of these mountains, a great basin, a desert valley, rimmed by volcanic hills, its wastes of billowy sand, its sloping dry wastes of rock and boulder, its shining patches of soda and salt blazing under the burning sky. It is a desolate, dreary region, its face of barrenness relieved only by the clusters of mesquit seen here and there. As viewed from these mountains it presents as clear a vision of desolation as could be well conceived. It covers nearly 200,000 acres of sterile land.

Valuable Deposits.

Thousands of acres of soda have been located, and in one place a mine of purest salt, covering over a thousand acres of unknown depth, has been located. As seen from the adjacent mountains, it shines in the sun with a fierce glare, and is clearly visible for over fifty miles. Enough salt is here already prepared for the markets of the world, and each year adds to the wonderful accumulation. The only question of its utility is one of cheap transportation. The soda fields here will also be of great value, as they can furnish fertilizing material to redeem a State from sterility.

INYO.

THE PREVENTION OF SMOKE.—In commenting on steam boiler furnaces the London *Engineer* says: "All our experience, extending over many years, goes to show that when the production of smoke is prevented by special devices for admitting air, either there is an increase in the consumption of fuel or a diminution in the production of steam. A noteworthy instance of this came under our notice recently. An extremely simple and elegant device for preventing smoke was submitted to an engineer. He was so much pleased that he had it fitted to the furnaces of a large Lancashire boiler, one of a pair, either of which could be used at will. An experiment was made by firing the boilers alternately week about, the same coal being used, and the same work being done by the engine, the same fireman being employed. The result was that smoke was practically entirely prevented; that there was no reduction in the steaming powers of the boiler; that the invention gave the firemen no trouble, and required no attention, and that the consumption of coal was increased by about 2 cwt. per day. The best smoke preventer yet devised is a good fireman; and providing the boiler is large enough for its work, the coal fairly good, and that the air is admitted—not too much—in a thin sheet, as by a Martin's fire-door, such a man will prevent the production of smoke and get admirable results."

ABOUT TO START UP.—The work of preparation about the mill at New Boston, which has been progressing for some days past, is nearly completed, and it is expected the stamps will begin to drop about the 20th instant. The ore to be crushed in this mill will come from the Lime Point and Lucky Baldwin mines, the former distant about two, and the latter 10 miles. Some 12 or 15 men will be employed in and about the mill, and once more will old New Boston be a busy place. It is a fact, one that is every day becoming more and more evident, that the little narrow gauge railroad has done, and is doing, more toward reviving old mining industries, and causing new ones to be started, in Esmeralda county, than would half a century spent in talk about big prospects, expecting thereby to induce the assistance of capital. When the matter of cheap transportation decides the subject, as it does everywhere in southern Esmeralda, then do men interested in mining conclude to commence operations.—*Candelaria True Fissure.*

THE OUTLOOK.—The number of new discoveries of exceedingly rich bodies of ore was never so great as during the year 1882. These valuable discoveries have not been confined to any particular State or Territory, but each and all of the mineral bearing portions of our country have furnished their quota of newly-discovered rich mineral deposits. During the year 1883 we may expect these rich discoveries to be increased two-fold over those of last year. The great increase in the facilities for reducing ore has created such healthy competition of affairs, that even ore that assays but \$5, \$10 and \$20 per ton can be worked at a profit. There is not a camp on this coast but has low-grade ore, and the time will come when it will all be worked.

The First Silver Mines on the Coast.

Some Interesting Scraps of Early History.

[Written for the Press by CHAS. SCHUCHARD.]

A few days ago I came across your publication of "Early History of the Comstock," Dec. 16, 1882. As the writer of that article seems to be anxious to establish true historical facts, I will make a few additional remarks.

It was in the spring of 1853 when Comstock presented to Maj. R. Allen, then Quartermaster General, in his office in San Francisco, a piece of black ore from Washoe. Allen showed the same to Mr. Killaly, a miner from Real del Monte, Mexico, and to me. Both of us pronounced it at once very rich sulphuret of silver, still an assay was insisted on. Killaly took the specimen to his office, and there we made the assay, which was between \$3,000 and \$4,000 per ton. Shortly after I learned that Killaly was dead. The excitement about this rich discovery had killed him. Maj. Allen proposed to me to go to Washoe to examine Comstock's discovery, but I declined, and returned to Arizona. If I do recollect right, you may find some notes on this in Blake's Mining Magazine, published at that time.

In regard to the first working of silver mines on the Pacific slope, after the country came in the possession of the United States, there is no doubt that it was in that part of Arizona south of the Gila river. In the year 1854 I came with Col. A. B. Gray on the preliminary survey of the S. P. R. R. across the country south of the Gila, at that time known as the Gadsden purchase or Mesilla valley. In the month of June we arrived in San Francisco. The interest in the Southern Pacific Railroad was then at high pitch. The information given by us did not fail to create some excitement, particularly our statement about the mineral wealth, although we could not offer substantial proof for this. A large collection of minerals gathered on the trip, including specimens of silver and copper ores, was buried by the boys in the Colorado desert, as useless stuff when the highly interesting pack-mule that carried the provisions and frying-pans declined to accompany us any further. Enterprising men like Major R. Allen, U. S. A., J. D. Wilson, Wm. Blanding, A. S. Wright and others concluded to send out an exploring party under direction of E. E. Dumbear. In October we completed our outfit in Los Angeles, and started, 20 men strong, toward Fort Yuma. I will give here the names of some of the Company: E. E. Dumbear, McElroy, F. Roustadt, P. Brady, G. Kibbers, George Williams, Joe Yancey, Dr. Webster, Porter, Alfonso Carson, Chas. Haywood, Bendal, M. Cook, myself, etc. Taking the road by Tinya alta, we discovered first the Ajo copper mine, about 90 miles E. S. E. of Yuma, where we left eight men to hold possession as best they could. Twelve of us continued to hunt for the Arizona mountains and the celebrated silver mine Plancha de la Plata, of which it is stated in Ward's Mexico, that a piece of native silver of 2,700 lbs. had been taken out by the Spaniards. After several months of search, we discovered this mine, finding first a piece of pure silver of about four ounces. A few days after a piece of 19 lbs was taken out of old shallow diggings, overgrown by stout oak-trees.

About this time our party at the copper mine was attacked early in the morning by a company of Mexican soldiers, headed by the Prefect and other authorities, who demanded the delivery of the mine, as situated in Mexican territory. (The boundary line had not been run then.) They threatened to take it by force if not surrendered inside of two hours. Mr. Haywood's spirited answer, "We don't think of surrendering; if you want to fight let us begin before the sun gets hot," settled that question. The troops retired to Presidio del Altar, Sonora, just in time to receive the news of our discovery of the long-lost Plancha de la Plata. Immediately our party was ordered to leave the country. Knowing our latitude, and being well aware that we had no right in Mexican territory, we thought prudent to comply.

From the Ajo copper mine the first lot of exceedingly rich ore was shipped to San Francisco in 1856, by the Arizona Exploring and Mining Company. The name of this company has been instrumental in conferring the name of "Arizona" to the Gadsden purchase. The Arizona mountains proper are situated in Sonora. In San Francisco I procured another outfit to work mines near Tucson. Worked first a copper mine about 35 miles west from there, and then a silver mine near San Xavier del Bac, for which a company was organized in 1856. The whole outfit for this, which after much delay arrived at Yuma, was afterwards lost with man and beast in the desert between Maricopa Wells and the copper mine. Only one man escaped. This crippled the enterprise so much that it came to a standstill.

About this time Mr. Herman Ehrenberg, who had been for some time on the Gila and in Sonora, had formed in New York the Sonora Exploring and Mining Co., of which Samuel Colt, of Hartford, Wm. Coleman, C. D. Poston, Maj. Hartley were Directors. This company arrived, with Mr. Poston, Ehrenberg and Brunton, M. E. in 1857 in Arizona and took up headquarters in the deserted town of Tubac. Shortly after, I joined this company. We dis-

covered, besides many silver mines in the Santa Rita mountains, those at Cerro, Colorado, and Arivac. There at the Heintzelman mine active mining operations were commenced at once, and very rich ore taken out. A lot of 22 tons, taken in 1858 to San Francisco, yielded at the works of Wass, Uzney & Warwick, \$450 per ton, other ore smelted at the mine \$900 per ton. We were then buying lead ores for flux from the then recently opened Patagonia mine, worked by old man Douglass and others. In 1858, Mr. Guido Kustel brought out a large lot of machinery for the Heintzelman mine for the reduction of silver ores by the barrel process. From that time the country became more and more settled.

Corralitos, Chihuahua, Mexico, Feb. 2d.

A Fine Mineral Region.

Speaking of the country rock in the vicinity of Owens valley, the Inyo Independent has the following to say in regard to several prominent districts: The formation of Russ, Beveridge and Ubehebe districts is principally granite and porphyry; that of Swansea, Cerro Gordo, Lee, Darwin and Lookout is mainly lime; that of Snow's Canyon, Sherman, Granite and Slate Range is porphyritic granite, the latter forming an unbroken mineral belt over 100 miles in length, and forming the western wall of Panamint valley. The formation of Panamint and Wild Rose districts is mostly lime; southward from Panamint it is granite, and that of Coso, Columbus and El Paso is granite and porphyry.

The Ores of these Districts

Are of many kinds and classes. Russ district has carbonate lead and silver and free gold ores; Beveridge, sulphuret gold and silver and free gold; Ubehebe, copper; Swansea, Lee, Cerro Gordo, Darwin and Lookout, carbonate chloride lead and silver; Snow's Canyon, sulphuret, free gold and silver; Sherman, Slate Range and Granite, sulphuret, chloride and base-milling silver; Panamint and Wild Rose, base-milling silver; Coso and Columbus, free gold and base silver; El Paso, copper, gold and silver. The ores of Beveridge, Russ, Snow's Canyon and Coso districts have usually been worked by free-milling process; Swansea, Darwin, Cerro Gordo and Lookout, smelting; Panamint, roasting and milling; Slate Range, milling. A mill is in process of construction at Reilly, Sherman district, to run as free milling.

The Mineral Belt

Extends nearly parallel to and at an average distance of about 50 miles east from the base of the Sierra Nevada mountains, starting at its southern end, at or near Calico, some 75 miles east of the Sierras, and running in a course west of north until opposite Independence, where it approaches within 20 miles of the Sierras; thence running almost due north a distance of 100 miles to the Indian Queen mine in Nevada. The mineral deposits along the base of the Sierras from Owens lake southward and the low volcanic range adjacent are so slight that they have claimed but little attention from the mining public, although a few mines of gold and silver have been discovered near Coyote Holes, in the vicinity of Walker's Pass, and northward in Alabama and Fish Springs districts.

CASE HARDENING LOW STEEL.—There are a number of processes for case hardening low steel or iron. It is desirable to have a carbon covering or envelope that does not evaporate or oxidize quickly at the temperature required for hardening. As the prussiate of potash contains in its anhydrous state only about 19% of carbon, while the potassium, iron and nitrogen are nearly 80%, it follows that it is too weak in carbon to be very effective in case hardening. As boiling water takes up nearly its own weight of prussiate of potash, a saturated solution may be made, to which is added as much bone charcoal, bone black, or charcoal from leather or horn as will take up the solution, or as much as can be made wet; the mass is then spread out and thoroughly dried in an oven. It will then be ready to mix with whatever may be used to make it adhere to the steel, such as oil, grease, or any other sticky substance. Bone, leather, or horn charcoal can be made by roasting it at a low red heat in a closed vessel, so close that no air can injure the product. A crucible or iron box covered with clean sand will do.—*Scientific American.*

BESSEMER STEEL FOR TOOLS.

—The application of Bessemer steel is constantly being extended. We have already shown that it is rapidly taking the place of puddled iron for nails, and, now, with regard to the possibility of welding or hardening this steel, it is claimed for the patent Siegfried process, now undergoing tests by the Central railroad of New Jersey and several furnaces in the Lehigh valleys, that turning tools, picks and bars, drills for rock work, and similar implements, may be made by this method direct from the Bessemer ingots rolled into bars. Satisfactory edge tools are also reported to have been made. The process adds about 25 cents per ton to the cost of the steel.

LEONARDO DA VINCI thus foreshadowed the telephone: "When one is upon a lake, if he puts the opening of a trumpet into the water and holds the point of the tube to his ear, he can perceive whether ships are moving at a remote distance; the same thing occurs if he thrust the tube into the ground, for then, also, he will hear what is going on far away."

Recent Contributions to the California State Mining Bureau.

[Published for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANSEN, State Mineralogist.]

[CATALOGUE.]

1234. Calcite Crystals—Traversella, Piedmont, Italy.
1235. Muscovite, a variety of Pyroxene—Mussa Alp, Piedmont, Italy.
1236. Idocrase Crystals—Mussa Alp, Piedmont, Italy.
1237. Calcite Crystals—Traversella, Piedmont, Italy.
1238. Celestine Crystals with Sulphur—Selly, Italy.
1239. Specular Iron (Hematite) on Quartz Crystals—Traversella, Piedmont, Italy.
1240. Globulites, Magnesian—Baldissardi, Piedmont, Italy.
1241. Calcite Crystals—Valley of Aosta, Piedmont, Italy.
1242. Granular Rock—La Mussa, Piedmont, Italy.
1243. Dolomite Crystals—Traversella, Piedmont, Italy.
1244. Pyroxene—Traversella, Piedmont, Italy.
1245. Vesuvianite, Idocrase—Mussa Alp, Piedmont, Italy.
1246. Cumulite—Piedmont, Italy.
1247. Garnets, Topazite—Mussa Alp, Piedmont, Italy.
1248. Talc—Traversella, Piedmont, Italy.
1249. Scheelite Crystals in Calcite—Traversella, Piedmont, Italy.
1250. Piedmontite—St. Marcel, Val. D'Aosta, Piedmont, Italy.
1251. Native Gold (Electrum) with boronite and quartz—Ollomout, Val. D'Aosta, Piedmont, Italy.
1252. Apatite on Chlorite—Piedmont, Italy.
1253. Barite—Italy.
1254. Barite, Melanite—Rome, Italy.
1255. Isolate—Traversella, Piedmont, Italy.
1256. Pyrite Crystals—Traversella, Piedmont, Italy.
1257. Blue Beryl—Mont. Bianco, Italy.
1258. Kastalerz—D'Aosta, Piedmont, Italy.
1259. Spondylus Costatus (Lam.)—Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.
1260. Pecten Latissimus (Brochi.)—Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.
1261. Strombium Mercatili (Davi.)—Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.
1262. Venus Islandicollis, Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.
1263. Venus Islandicollis, Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.
1264. Venus Islandicollis, Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.
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1298. Venus Islandicollis, Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.
1299. Venus Islandicollis, Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.
1300. Venus Islandicollis, Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.

USEFUL INFORMATION.

New Building and Cementing Material.

A German exchange describes under the head of "Tripolith," a material designed for building and cementing purposes, which has recently been patented by Herr B. Von Schenck, of Heidelberg. The extract given below is translated from the original article:

"The new material Tripolith, or triple stone, is a union of silicium, calcium and iron oxide. These elements are ground, burned, mixed, quickly cooled, then stirred with water and dried, the resulting product being an extremely fine gray mass. In its characteristics, Tripolith stands between gypsum and cement, possessing great hardness and power of resistance, which increase with the age of the material. The cohesive powers of the stone are not equalled by either gypsum or cement, and can be regulated in from 10 to 15 minutes, by the addition of lime water, in suitable amount. It can be poured in the soft state into any form, whether of metal, gypsum, lime or gelatine, and can be taken out of the form in 10 minutes, much more easily than can be done with gypsum. In all weathers it is the same, neither changing with heat or cold, or undergoing any chemical alteration when subjected to dampness or placed under water. Paint, applied to it, whether oil or lime, does not loosen or scale off, as is the case with gypsum." For use in various ways, Tripolith is prepared in the following mixtures:

1. One-half Tripolith and one-half fine sand.
2. One-third Tripolith with one-third lime, and one-third fine sand.
3. One-third Tripolith with two-thirds coarse, washed, river sand.
4. One-half Tripolith with one-half lime.

For purposes of safety, in resistance to water and fire, Nos. 1 and 3 are recommended. The experiments and trials with Tripolith have now extended over a space of two years, and the results have in all cases exceeded expectations. A particularly noteworthy instance of this fact is shown in the experiments made upon it by the royal commission for testing building materials at the technical school in Berlin, where its advantages were made so apparent, that it was recommended in place of gypsum or cement.

Not only is the Tripolith a satisfactory building material, but it is being largely employed in surgical practice, for bandaging, in place of the gypsum casts previously used. The eminent practitioners and authorities, Prof. Dr. B. Von Langenbeck and Prof. Dr. Czerny, give the Tripolith bandages their unreserved approval, on account of their quick, hardening lightness, and imperviousness to water.

"It is claimed that the new triple stone can be used wherever Portland cement has been commonly employed, with equal satisfaction, and at only half the cost."

THE WAX PLANT.—The wax plant, indigenous in Carolina and Pennsylvania, is now being cultivated on a large scale in Algeria, while its acclimatization in Tunis has been attempted with favorable results. The fruit, enclosed in a bag of coarse cloth, is plunged into boiling water, and in a few seconds the liquid wax floats on the surface. This is skimmed off and dried, and forms a good substitute for beeswax, as it has the same chemical composition. Its odor is agreeable, the root possesses medicinal virtues, and the leaves are used for protecting textile fabrics from the ravages of insects.

THE TELEPHONE.—It hardly seems possible that so recently as 1877 the telephone was a toy; yet such is the case. At the present time \$7,000,000 are embarked in the extension of the telephone in England, and this capital is already winning a revenue of \$500,000 a year. Until a very recent time the telephone business has been a monopoly in England, of which the postoffice held the controlling power, but this has been broken, and it is said that a very strong competition will very shortly be felt.

GLUEING.—French cabinet makers use a glue-pot with an inside pan made of glazed earthenware and divided radially into three divisions, in one of which is kept strong glue, in another weaker, and in the third water only, with a brush or piece of sponge for cleaning off superfluous glue from the work. Chalking the joints in glueing end-wood is not to be recommended; a better plan is to size the end-grain with thin glue first, and then make a smooth face before glueing permanently.

THE MANUFACTURE OF MILK SUGAR.—It is reported that the manufacture of milk sugar has been begun by newly invented processes at an Ohio cheese factory. Hitherto the \$100,000 worth of milk sugar used in this country in compounding medicines has been imported from Europe, mainly Switzerland, Germany, and France. It is to be hoped that the new industry will prove successful and applicable at least to all our large cheese factories. At present this element of milk is in large measure wasted.

BROZING LIQUID.—Ten parts of aniline red and five parts of aniline purple are dissolved in 100 parts of 95% alcohol, on the water-bath, and the solution, after the addition of five parts of benzoic acid, boiled (for 5-10 minutes) until it has changed its greenish color to light bronze-brown. Applied with a brush upon leather, metal or wood, the liquid produces a magnificent bronze coating.

BEATEN ALUMINIUM LEAF may now be obtained in books like silver leaf, and is largely used instead of silver for decorative purposes. Mr. Levison suggests heavy aluminium leaf as a substitute for tinfoil for coating Leyden jars, and similar electrical apparatus. Area for area, it does not cost much more, is much lighter, and permanently retains its polish. A book of 50 leaves of aluminium, of the ordinary thickness, cost 25 cents; of a thickness suitable for Leyden jars, 50 leaves about 4 inches square, cost \$1.00.

WOOLEN SHAWLS may be nicely washed if you put half an ox-gall into two gallons of tepid water. After washing thoroughly in this, rinse in another tub with the other half of the ox-gall and the same quantity of water; shake the shawl out and let it dry in a warm room, but not in the sun. Carpet-rugs may be cleansed in the same way, but, after washing, if they are scoured with a soft brush, they will look as bright as new.

TO RESTORE COLOR.—When the color on a fabric has been accidentally or otherwise destroyed by acid, ammonia is applied to neutralize the same, after which an application of chloroform will, in all cases, restore the original color. The application of ammonia is common, but that of chloroform is but little known.

WHERE A DOLLAR MAKES A MILLIONAIRE.—A Russian traveler in the Malay peninsula claims to have found in use there the smallest "coin" in the world. It is a minute wafer made from the juice of a tree. Its value is about the millionth part of a dollar.

A NEW PLANT, says an exchange, has been discovered in Mexico, which is remarkable for its fiber. It is thought that it will revolutionize textile industries, since it is even more beautiful than silk. It has not yet been named.

THE VERY LATEST.—At the last meeting of the stockholders of the Keeley Motor, they found a pressure of 27,000 horse power to the inch in the generator, and \$23.46 in the treasury.

THE SAW.—The buzz of the saw is heard in 25,708 mills in this fair land of ours, and \$146,155,385 worth of logs and mill supplies is used up every year, the product therefrom being valued at \$233,367,729.

rest are constantly at work destroying the germs of disease. But it is different with the water which we drink. It is quite possible for a well to become poisoned while yet the water is crystal-clear, and to neither taste nor smell convey any hint of its defilement. One dares not point the moral of an article like this with instances taken from his own neighborhood, lest the sensitive feelings of his friend be wounded. Therefore I will quote again from the *American Agriculturist*, in whose pages first appeared this startling account of a case of well poisoning:

In Bergen county, N. J., there is an ancient dwelling used as headquarters by American officers in the revolution, and ever since occupied by people of wealth, many of whom moved into the country for the health of their families. This house has a privy-vault located 60 or 80 ft. from the dwelling on lower ground. The well stands near the house and quite as far from the vault on ground higher still. The roots of an *Ailantus* tree somehow penetrated to the water and were supposed to cause a change in it. So the tree was cut down, the roots cleaned out of the well, and it was supposed to be purified. Some time after diphtheria appeared in the neighborhood, attacking only those whose systems were adapted to give it a lodgement through the subtle influences of foul air or foul water, decaying vegetation in the cellars, obstructed sink drains, putrefaction in privy vaults, or some such cause.

The family occupying the old mansion was visited. Nine out of 14 persons were attacked, and one died. Then, of course, everything was examined, cleansed and purified. The privy was found with some four or five feet of water in the vault, as it had been from time immemorial, except in very dry seasons. This was a bubbling seething mass when disturbed, odorous and vile. Half a barrel of strong solution of copperas was poured into it and a great change was at once perceived, but not here alone. The well water, which had been used both for drinking and washing, suddenly became very "hard," and upon examination was found to contain large quantities of copperas, proving absolutely that there was then, and doubtless had been for years, a direct communication from the privy vault to the well.

Is it likely, one may ask, is it even possible that this is a solitary instance? On how many California farms may not a similar state of things exist? We have all seen houses where the privy vault is by means 60 or 80 ft. distant from the well. What is going on under-ground, either by the burrowing of vermin, or the natural drainage during the rainy season, it is impossible to tell. One would think that the mere suggestion of such a danger would be enough to rouse the most indolent, and yet the article from which I have quoted ends sadly enough—"This terrible experience will be unheeded by the great proportion of the population. Other privies will contaminate the wells. 'Malaria,' as it is sagely called, will cause bilious fever, and chills, and typhoid fever, and diphtheria, perhaps, and the air will take the blame instead of the water."

Let us hope that among the readers of your paper there may be some wise enough to learn a lesson from the experience of others. A privy vault is always a plague spot, a shame and a misance.

There is not the slightest necessity for its existence upon any farm. Have it thoroughly emptied and cleaned, then fill up the hole with earth and stones, and substitute for it the earth closet of our later civilization.

This is so easily constructed that any man can make it, and so deliver himself and his family from one fruitful source of danger, of disease and death.

A CURE FOR SCIATICA.—A correspondent, writing to London *Family Pair*, says: "A cure for neuralgia and sciatica—and, as I am told, an unfailing one—is too valuable not to be recorded. An English officer, who served with distinction in the war with Napoleon, was once laid up in a small village in France with a severe attack of sciatica. It so happened that at that time a timman was being employed in the house where he lodged, and that this timman, having been himself a soldier, took an interest in the officer's case, and gave him the cure, which, in this instance, succeeded immediately and forever, and which I am about to set down. It is at any rate so simple as to be worth a trial. Take a moderate sized potato, rather large than small, and boil it in one quart of water. Foment the part affected with the water in which the potato has been boiled, as hot as it can be borne, at night before going to bed; then crush the potato and put it on the affected part as a poultice. Wear this all night, and in the morning heat the water, which should have been preserved over again, and again foment the part with it as hot as can be borne. This treatment must be persevered with for several days. It occasionally requires to be continued for as much as two or three weeks, but in the shorter or longer time it has never yet failed to be successful."

LACK OF SURGICAL SKILL AMONG THE CHINESE.—Lieut. Shore, in a lecture on China and Japan, says, that until the arrival of foreign surgeons, there was not a native in the whole Chinese Empire who could remove a tumor, treat an abscess, or even set a fractured limb with certainty, and even now there are no surgeons in the army or navy.

PINKEYE IN CHILDREN.—Several cases have recently been reported in at least two different places in California where a disease has been developed in children's eyes which closely resembles pinkeye in horses, and which thus far has baffled the skill of physicians. Chleo is one of these localities.



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A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Feb. 24, 1883.

TABLE OF CONTENTS.

EDITORIALS.—Auburn Quartz Mines; Baker's Mining Horse Power, 121. Passing Events; Southwestern Nevada—Early Explorations and Settlement; The "Mining and Scientific Press"; Academy of Sciences, 128. The Carson and Colorado Railroad; Determining Hardness of Minerals, 129. Prehistoric Footprints, 132. The Silk Cultivator; An Improved Time Detector, 137. Patents and Inventions; Notices of Recent Patents; Floods and Forests, 140.

ILLUSTRATIONS.—Baker's Horse Power for Miners' Use, 121. Map of the Carson and Colorado Railroad, 129. Geographical and Topographical Map of the Sweet Water Mines, Patterson Mining District, Mono County, Cal., 131. Prehistoric Footprints, 132-33-34.

CORRESPONDENCE.—Tucuman District; Saving Fine Gold, 122. Patterson District, Mono County, 131. Notes from Eureka, Nev., 134-40.

MECHANICAL PROGRESS.—Two Sources of Damage to Boilers; Comparative Strength of Yellow and White Pine; Effect of Heat upon the Structure of Steel; Life of a Locomotive Boiler; A Miniature Locomotive; An Iron Witch, 123.

SCIENTIFIC PROGRESS.—The Microscope in Testing Timber; Increase of Weight by Combustion; Height of Land and Water; Action of Poison on the Petals of Flowers; Chrome Yellow; Tidal and Other Waves; Optical Telegraphy; New Receiving Telephone; The First Census of 1883, 129.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Assessments, Meetings and Dividends, 124.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana and New Mexico, 124-5.

USEFUL INFORMATION.—New Building and Cementing Materials; The Wax Plant; The Telephone; Glueing; The Manufacture of Milk Sugar; Bronzing Liquid; To Restore Color; Where a Dollar Makes a Millionaire; The Very Latest; The Saw, 127.

GOOD HEALTH.—Remove the Causes of Disease; A Cure for Syphilis; Lack of Surgical Skill Among the Chinese; Pinkeys in Children, 127.

MISCELLANEOUS.—Copper Mines; Mining Surveys and Surveying Instruments; Of Interest to Miners, 122. The Inyo Range; The First Silver Mine on the Coast; A Fine Mineral Region, 126. Recent Contributions to the California State Mining Bureau, 127. Mining Districts and Operations in Southwestern Nevada, 130. The Soda Industry, 131.

NEWS IN BRIEF.—On page 140 and other pages

Business Announcements.

Copper Smelter—Rankin, Brayton & Co., S. F.
Sheep Holder—C. B. Cook, San Francisco.
Redlands—Judson & Brown, San Bernardino, Cal.
Abel Stearns Rinchos—A. Robinson, S. F.
Belting and Lacine—H. Royer, San Francisco.
Mines Wanted—Almarin S. Paul, San Francisco.

Passing Events.

This week we present our readers with a double sheet edition of the PRESS especially devoted to the interests of southwestern Nevada, and that portion of California bordering thereon.

The recent rains have been very encouraging to the miners in this State, and as we write (Thursday), there are indications of more to come.

The floods in the East and in Europe are reported as very disastrous, and stormy weather is reported from many quarters. Extreme cold seems the rule, also, though in this locality for a week or so we have had mild and fine weather, and have experienced no storm at all this winter.

By the end of next month the men who have been in the towns and camps all winter will begin to look about them and start at work prospecting. In the more northern regions, however, a month or more beyond that will have to be passed. Many men are anxiously awaiting the disappearance of the snow to begin their regular season's "prospect."

Southwestern Nevada—Early Explorations and Settlement.

Few sections of our mineral domain are attracting more attention just now than that occupying the southwestern angle of Nevada and the adjoining region over the line in California. Although this country was partially explored at an early day, a few adventurous prospectors having entered it soon after the discovery of the Comstock lode, very little was known about its mineral resources for some time thereafter; its remoteness, arid and sterile character and the unfriendly disposition of the Piute and the Shoshone tribes who inhabited it having prevented its more thorough examination. For 10 or 12 years after the first rush over the Sierra Nevada this outlying district remained a *terra incognita*, but sparsely settled and but little explored. Toward no other quarter did the mining frontier in Nevada advance so slowly as in this direction.

The Wily and Murderous Digger.

The native tribes dwelling in this part of the State, though a miserable and cowardly set, are treacherous and blood thirsty, having on many occasions killed or plundered such small parties of whites as through carelessness or the paucity of their numbers have invited attack. These savages earned for themselves a perfidious and murderous reputation at an early day, having waylaid and butchered the first company of whites that ever crossed their country.

More than 50 years ago a party of trappers under Captain Jedediah S. Smith, being in the service of the American Fur Company, were nearly all killed by these Indians while on their way from California to the company's camp of rendezvous on Green river; This occurred somewhere in the vicinity of the Montezuma mountains or possibly a little further west. Many of the prospectors who first entered this region were also killed by these miserable Diggers, the number who have so perished being larger than is generally supposed. These were the assailants of Breyfogle and his companies who while in search of the so-called "Lost Lode," were on two different occasions attacked and driven back by them, several of the party being killed and Breyfogle himself badly wounded. Though generally so unreliable and vicious these savages have sometimes allowed small parties and even single individuals to pass through their country unmolested. In the summer of 1860, Dr. DeGroot went far into the depths of this wilderness unarmed and alone, and although he traveled everywhere camping often near the wigwags of these people, they gave him no trouble, for the reason, probably, that there was so little in his outfit calculated to excite either their enmity or their cupidity.

From 1860 to 1863 it was considered unsafe for small parties of whites to venture further toward the southeast than the vicinity of Walker Lake, about 100 miles from Carson City. By 1872 the border had been advanced to the White Mountains, another hundred miles further on in that direction. Meantime, a good many miners who had gone out into these deserts to prospect for mineral deposits disappeared, and were heard of no more. Little inquiry was made about them at first, because no one knew whether they had been killed by the Indians or whether they had drifted off to some other part of the country, or, perhaps, used up and discouraged, returned to California. As late as 1867, it was deemed necessary to station a detachment of U. S. soldiers in Fish Lake valley, only 17 miles beyond the town of Columbus, to look after the Shoshones, who had committed numerous depredations in that vicinity. About the same time several settlers were killed, and much stock run off at Red Mountain and Palmetto, lying some distance north of Lake valley. A few years later some miners were killed in the White Mountains, to the south of Fish Lake valley, and all the whites forced to leave, this being the work of Joaquin Jim and his band. About the year 1873, the mining frontier was carried over the White Mountains to the basin of Death Valley and thence on to the Colorado; the Indians off that way having caused but little trouble thereafter. Meantime, the Owens river country had been pretty thoroughly prospected, and a number of mining camps established in it. Yet, here, too, the presence of U. S. troops was considered necessary—a strong garrison having been placed at Fort Independence, near Owens Lake, and kept there until the past few years.

Dry and Desert Land.

Besides the hostility of the aborigines, the extreme aridity and barrenness of this region have done much towards retarding its exploration and settlement. This is the most desolate portion of Nevada, "Death Valley" and the Amargosa, river of bitter waters, lying within its borders. Three-fourths of it consists of broad valleys or wide extended plains, waterless, treeless and nearly destitute of every form of vegetation. Scattered over these wastes are great fields of sand, alkali flats, salt beds and mud lakes, tracts covering thousands of acres being impregnated, in some spots very richly, with borax and soda. In the dry season, these salines glittering in the sun present a surface white as snow, many of them during the wet season being converted into shallow lakes. But little rain ever falls here, though immense quantities of water are sometimes precipitated in a few

minutes in the form of "cloud-bursts," and the snow falls to a considerable depth on the higher mountains. The whole country may be considered a high plateau, elevated from 2,000 to 5,000 ft., its highest portion being toward the north and west, whence it falls away to "Death Valley," on the southeast, which region is depressed below sea-level. Across this plateau run numerous ranges of mountains, the sites of the metalliferous deposits varied in kind and infinite in number. While this country affords a considerable amount of pasturage, containing also some few patches of natural meadow and arable land, its principal source of wealth consists of its mines, including the various salines above mentioned, some of which latter have already been partially utilized.

The Argonauts.

The wave of immigration that set in on the discovery of the Esmeralda mines, in 1861, carried into the western portions of this region a large population, which, with the receding of that wave a few years later was mostly borne away again, leaving the country almost barren of inhabitants. Some of these Esmeralda adventurers having, however, drifted as far east as Columbus, finding many promising mineral indications, formed a district, and, going to work, stopped there permanently; and thus was a beginning made toward settling the more westerly section of this wilderness, other mining districts having afterwards been laid out and gradually populated in the vicinity of Columbus. In 1864

Another Wave of Immigration.

Setting in carried a large number of miners into Nye county, far to the east. Being disappointed in their expectations there the most of these miners beat a speedy retreat, returning the same year whence they came. A few, however, remained, and, scattering to the south and east, explored the country off that way. These were the men who prospected the mountains on either side of the Sinkavata valley, a broad depression nearly 50 miles long, having the Shoshone range on the east and the Mammoth on the west. The Alexander mine, at Grantsville, is situated in the former and the Downeyville mines in the latter. These pioneer prospectors in the course of the next few years laid out many new mining districts extending from Barnes Park on the north to Death Valley on the south, a distance of nearly 200 miles. They were the organizers of the Barnes Park, Union, Mammoth, San Antonio, Indian Spring and the Lone Mountain districts.

The Owens River Country.

In 1862, some of the Esmeralda adventurers straggling south, prosecuted the search for gold and silver lodes, in the Inyo and Coso mountains, which border Owens valley on the east. Although this region lies outside the State of Nevada, it has a history very like, and actually forms a part of the desert lands we are considering. Here, too, the pioneers had many difficulties to contend with. The country was barren and a long way off. The Indians were troublesome and the ores rebellious. Water was scarce, and wood by no means plentiful, these, with a variety of minor hindrances, having formed such an aggregate of obstruction, as served to utterly defeat these first efforts at mining, and in the course of a few years nearly depopulate the country. After an interregnum of six or eight years, mining here was resumed, and prosecuted with varying fortunes, the success achieved at Cerro Gordo and a few other points having been more than offset by the failures that occurred at Panamint, Darwin and many other places. After a season of decadence running through a series of years, the mining industry throughout this region appears to be reviving. That it abounds with valuable deposits of gold, silver and lead, admits of no question, the disasters alluded to having been due mainly to the causes mentioned, but in part, also, to inexperience and mismanagement.

Another Tidal Wave of Immigration.

In the fall of 1868 the White Pine stampede having set in, carried during that and the following year a multitude of miners well on toward the southeastern border of Nevada. From White Pine as a center this army of prospectors spread out in every direction, those who penetrated the country to the south and west meeting there the van of the Esmeralda and the Nye Country Argonauts, who, during so many years had been slowly making their way toward the south and east, and thus, was a thorough exploration of this entire section of the State brought about and the subjugation of the Digger tribes finally effected.

ARIZONA.—Our correspondent and agent, Mr. B. W. Crowell, will soon visit the various mining camps and districts of Arizona in the interests of the MINING AND SCIENTIFIC PRESS. We shall be pleased to have our friends where he visits to assist him with such information as they are able to give him. In view of the fact that the PRESS has devoted a great deal of space to Arizona affairs and developments from time to time, and on special occasions, we hope to gain an increased subscription list there by Mr. Crowell's visit.

ONE week ago we noted the fact that the management of the Mammoth Mining Company would discharge men for patronizing saloons. We understand that about a dozen men employed at the smelters have been seen coming out of saloons, and the order was enforced against them at once.—*Salt Lake Tribune*.

The Mining and Scientific Press.

This edition of the MINING AND SCIENTIFIC PRESS consists of 24 pages, eight more than the usual issue, and is devoted mainly to the interests of southwestern Nevada. This region is a rapidly growing one and will be developed with more energy now that means of transportation are at hand.

We shall, as occasion offers, issue double editions of the PRESS and otherwise continue to improve it. That our efforts in this direction are appreciated we quote opinions from several sources.

Mr. Wm. H. Washburn, of Central City, Dakota, writes us: "Your paper is highly prized by me for the valuable information it in reference to mine appliances and operations; and I hope it will continue to improve as it has in the past years."

The Candelaria *True Fissure* says: "The Mining and Scientific Press now presents a very fine appearance, with its new dress and enlargement."

The following is from the Georgetown (El Dorado Co.) *Gazette*: "The MINING AND SCIENTIFIC PRESS has put on a bran new dress of type. It is growing more interesting all the time. So great has been the improvement in this journal of the miners that one who has not read the paper for some time would scarcely recognize the tried and true old friend of the miners' interests. Every enterprising miner should read the San Francisco MINING AND SCIENTIFIC PRESS, published by those sterling old-timers, Dewey & Co. If you cannot subscribe for it now, by all means send 10 cents for a sample copy. The practical hints and information which it curls weekly from the various mining localities of the Pacific slope, to say nothing of its valuable editorials and splendid illustrations, are calculated to be of invaluable aid to the prospectors, millmen and miners generally. One single idea obtained from the PRESS may prove the keynote to your success."

The Idaho *Messenger* (Challis, Idaho), in quoting some two columns of our annual review, says: "This excellent mining journal comes to us in all its beautiful new dress, filled with general matters, but pre-eminent in its mining news and cuts. It is the pride of the Pacific coast. * * * It gives a review of the past year, which is so much better than we could give that we quote."

Academy of Sciences.

On Monday evening, last, the California Academy of Sciences held its regular semi-monthly meeting, with Prof. George Davidson in the chair. The following resident members were then elected: Dr. F. V. Hopkins, M. D., Henry B. Osgood, Miss M. H. Jones, Mrs. Donald McLennan. Judge Richard Rising, of Nevada, and William S. Campbell were proposed for membership.

A joint committee, chosen from members of the Board of Trustees, Council and Academy at large, was appointed to consider the most expedient manner of obtaining a much needed permanent building for the use of the Academy, and the proper display of its museum to the public. It was composed as follows: James M. McDonald, Charles F. Crocker, Thomas P. Madden, Lewis Gerstle, George Davidson, Justin P. Moore, Chas. G. Yale, H. Herman Behr, H. W. Harkness, W. A. Aldrich, William Norris, Fred. Gntzkow, Jacob Z. Davis and Thomas Price.

Among donations to the museum were specimens of copper ore from Elko, presented by W. J. Hanks, Sheriff of Storey county, also gypsum in dolomite, and a large fossil tooth of the *Elephas Americannus*, found among dredgings taken from the bed of Coosaw river, South Carolina, by L. M. Keene, U. S. R. M. Prof. Joseph Le Conte read a paper "On the Genesis of Metalliferous Veins."

HAWTHORNE BOOMING.—Lots that could have been bought in Hawthorne a month ago for \$50 are now held at \$200. Seven or eight new houses are going up. Johnny Bennets, late of Bodie, is building a large house torn down at Silver City, and will be ready to open a first-class hotel in a few weeks. The Mount Cory road is nearly completed, and the talk about removing the county seat from Aurora to Hawthorne causes the little town to be looked upon with considerable respect. It will no doubt be a thriving camp this summer.—*Reno Gazette*.

In the Colorado Legislature a bill has been passed to tax the net proceeds of the mines. The capitalists who own the big mines are much exercised, and the bill is bitterly denounced. This vote of the Legislature shows that the miners no longer control legislation in Colorado.

The Carson and Colorado Railroad.

Its Strong Backing, Speedy Construction and Good Management.

This road commences at the Mound House on the Virginia and Truckee railroad, eight miles east of Carson City, Capitol of the State of Nevada, and extends thence in a generally south-east course to the town of Candelaria, a distance of 158 miles. It is a narrow gauge track and has been built and outfitted, within a little more than two years, having been commenced in the spring of 1880 and completed to its present temporary terminus in the summer of 1882. It is a very substantial and well appointed work, having been built with due regard to permanence and safety and equipped in a manner equal to any other road in the country. Being financially strong, this company have spared no expense necessary to insure for the road the greatest efficiency. The practical conduct of the work has from its inception been under the management of H. M. Yerington, a man of large experience in this line of business and for many years General Superintendent of the Virginia and Truckee railroad, which position he continues to hold. It has been largely due to his careful planning and mulling energy that the road has been built at a very moderate cost and in so short a time. Since the opening of the road it has done a good business, the company having pursued a liberal policy which has not failed to give satisfaction to the general public and meet with the approval of their patrons.

A Naturally Favorable Route.

The country traversed by this road, though dry and barren, was found to be exceedingly favorable for railroad construction the entire route, with the exception of one low range of mountains, being nearly level. There were no large streams or deep canyons to cross, making necessary extensive bridging, nor is there any trestle work along it. So, also, was there but little deep cutting or tunneling required here. There were scarcely any trees or boulders along the route to be removed, and no marshy ground whatever to be piled or filled in. As the track runs nearly all the way on the public domain, the right of way cost little or nothing. It may be said, in short, that this road was built at a maximum of speed and a minimum of cost, some delay having occurred after its commencement through non-arrival of iron rails and other materials.

A Region Rich in Mineral But Poor in Agricultural Resources.

While the country which this road crosses and is intended to accommodate is so generally arid and sterile, it abounds with valuable deposits of minerals of almost every kind, its principal resources in this direction consisting in its mines of gold, silver, lead and copper, concerning which a good deal has been said elsewhere in this issue of the Press. Until these resources are more fully developed the business of the road must, of course, remain comparatively limited. That the work of this development will now proceed rapidly, admits of no doubt, as it has already received a great impulse, having previously been kept back only through lack of the cheap transportation facilities, which the road will now afford. Hence forth great progress may be looked for in the various branches of mining throughout this whole region of country, which, as we have already shown is very extensive. Before the advent of the railroad only the richest ores could be worked here, or shipped from the country with any profit. Now, this is all changed, the rich mines paying largely, while many of the poorer ones, before idle, are being worked with satisfactory results. Many of the mines here carry a large percentage of lead, a metal that would not bear wagon transportation 200 miles over sandy roads through a desert country. Hence, this class of mines could not, before the railroad was built, be worked to advantage. To the Shawmut Company, which will hereafter be turning out large quantities of lead-silver bullion, there will be effected, through railroad carriage, a saving of many thousand dollars every month.

And thus will it come to pass, that while the railroad will stimulate mining, mining will make business for the railroad, this reciprocal action greatly benefiting both. The very barrenness of the country will work advantages to the railroad, as it will necessitate the importa-

tion of almost everything required in the mines. Provisions, fruits and vegetables, grain and horse-feed - even hay - lumber, and, after a time, fuel of every description, unless mineral coal shall happen to be found, will have to be brought in over the railroad, creating, with the ores and base bullion to be carried out, an immense freighting business both ways. With the railroad it has become possible for the inhabitants of the mines to enjoy many luxuries, such as fresh fruits and the like, which before they were deprived of. Express and mail time between San Francisco and Candelaria is now 29 hours - formerly 85 hours - while freight, if received in shipping order at all, was supposed to be on time whenever it arrived, provided it was not over three or four weeks on the way.

While the present traffic of this road is already so unexpectedly large, the future prospects of the company are of the most encouraging kind. That the enterprise is likely to turn out so well will be gratifying to many who have no direct interest in its success, since it required some nerve for a company to plunge into a vast

abundant crops of fruits, grass and grain. In the mountains, on either side of this valley, is a tier of mining districts, all of which abound with mineral wealth, and into which the railroad will infuse new life. After entering Owens river valley, this road will meet with but few obstructions, the country consisting of an open, almost level plain, clear on to the Colorado. It would be difficult, in fact, to find elsewhere 300 continuous miles more favorable for railroad construction than this. Across the Mohave desert, for a hundred miles, an engine might almost be run without rails, so level and hard, and so free from impediments is the gravelly surface. It is expected that a large population will next year gather into the region opened up by this railroad, as it presents one of the best fields on the coast for both prospectors, business men and investors.

Supt. H. M. Yerington has submitted the following annual report of the Carson and Colorado Railroad to the Secretary of State of Nevada: Amount of capital stock \$6,000,000; amount of capital paid up \$2,250,000. Owing

Determining Hardness of Minerals.

Hardness is a character of much importance in the discrimination of minerals. It is usually expressed by comparison with the following "scale of hardness":

- | | |
|---------------------------|---------------|
| 1. Talc. | 6. Orthoclase |
| 2. Gypsum (or rock salt). | 7. Quartz. |
| 3. Calcite. | 8. Topaz. |
| 4. Fluor. | 9. Corundum. |
| 5. Apatite. | 10. Diamond. |

The hardness of a mineral may be determined in different ways:

1. By attempting to scratch it with the minerals in the foregoing list successively.
2. By passing a finely cut file over the specimens, with a rather firm pressure, three or four times.
4. By attempting to scratch the specimens with a knife.

Several trials should be made to obtain certain results, and each method should be tried if possible. Thus, suppose the specimen is a piece of chalcocite, No. 2 (gypsum), fails to scratch it, but No. 3 (calcite), scratches its surface readily. Next, reversing the method, it is found that the specimens under trial will scratch No. 2 readily, but not No. 3. On trying it with the file it is not rubbed away so readily as No. 2, but more than No. 3. It would be sufficient to set down its hardness at 22.

Easy as this method may seem, some precautions are never-the-less necessary. Thus, in a fibrous specimen scratch directed across the fibres will always indicate a lower degree of hardness than the true one; the scratch should, therefore, be parallel to the fibres, or still better, to the surface of a transverse fracture.

A sound, undecomposed specimen should always be selected, since the hardness of minerals is greatly affected by decomposition. Many minerals are softer when first obtained than after they have been kept some time in a dry cabinet. In crystals the edges and angles are often considerably harder than the faces, and those of primitive form than of the modifications. The portion of the specimen selected for trial should be, as nearly as possible, of the same shape as it has of the comparative specimens.

Brittleness should not be mistaken for hardness. Many minerals which are too hard to be scratched are yet forced away in powder before the knife to some extent. Some minerals contain hard particles of foreign matter imbedded in them; these should not be overlooked.

A series of substitutes has been arranged for use when a scale of hardness is not available, i. e.:

1. May be readily impressed with the finger-nail.
2. Is scarcely impressed with the nail; does not scratch a plate of copper.
3. Scratches a piece of copper, but is also scratched by it.
4. Is not scratched by a piece of copper, but does not scratch glass.
5. Scratches glass slightly; is easily scratched with a knife.
6. Scratches glass easily; is scratched a little with a good knife.
7. Is not scratched with a knife, but yields to a file.
8. Cannot be filed, but scratches a rock crystal.
9. Scratches a topaz.
10. Scratches a ruby.

LUCKY PROSPECTORS.—A correspondent at Luning writes: The Calanity mine, distant some three miles northeasterly from here, was disposed of on the 13th instant, to a New York syndicate for a consideration of \$30,000. I. B. Giles, familiarly known as the "Deacon," and Arthur George are now the recipients of a modest fortune.

Map of the Carson and Colorado Railroad 1882.

Scale 60 Miles to One Inch.



desert like this, even though its mineral resources were known to be both varied and extensive.

To Be Pushed Ahead.

The objective point of this road is, as its name indicates, the Colorado river, to which it will, in good time, be extended. Already work upon it is in progress beyond Candelaria, its present terminus, the route having been surveyed and located for a long distance south of this point. The heavy work on the summit has been completed, except that on the tunnel, the only one there will be on the road, and this is almost finished. As the track is graded nearly to Benton, the cars will soon be running to that place, the center of a fine farming and grazing district. There is also in this vicinity around Partzwick and elsewhere a good mining region. But the mining, like the agricultural interest here, has suffered through lack of cheap transportation.

After reaching Benton the road will not pause, but be pushed on into the Owens river country, which it will probably reach sometime next year. Along Owens river, it will, for a hundred miles or more, traverse rich bottom lands, capable, with irrigation, of producing

to the road being in course of construction it is impossible to furnish information as to cost of construction. Amount of indebtedness: First mortgage bonds issued and due, \$2,370,000; sundry accounts, \$15,300.79; total, \$2,385,390.79; due this company from sundry sources, including stock, etc., \$45,432.88; amount paid for the transportation of freight, passengers, mail, express, etc. \$359,031.68, and received for transportation of construction from contractors, \$82,222.43; total, \$442,254.01; amount of freight of all kinds hauled, in tons, 56,581; amount paid for account for operating expenses, \$196,149.78; number of dividends paid, 2; amount of dividends paid, \$112,500; amount of interest paid on bonds, \$135,000—\$247,500; amount of net earnings, \$246,104.23. Engine houses and shops, 3; engines, 6; passenger coaches, 3; combination coaches, 3; box cars, 30; platform cars, 3; ore cars, 15; push and hand cars, 25.

To give an idea of the looseness of the ore in Tombstone district, and the little labor required to extract it, the *Epigraph* informed on good authority that not over 3,500 pounds of powder is used during a month. Some mines on the coast use more powder in one week than the largest Tombstone mines use in a month.

Mining Districts and Operations in Southwestern Nevada.

We publish in this issue of the PRESS a map of the country occupying the southwestern part of the State of Nevada, including a section of California lying adjacent. On this map are laid down all the important mining districts, towns and other places and objects of interest in this region of country, including the line of the Carson and Colorado railroad, so far as surveyed and determined. On this map only what may be considered the live mining districts are shown, being those in which a regular organization has been maintained, and in which more or less work is carried on; districts once organized but subsequently abandoned not being laid down. While the relative positions of the districts and the distances that separate them may not in all cases be absolutely correct, they will be found sufficiently accurate for most practical purposes. In the table given below the distances have been computed from Carson City, Bodie, Aurora and Columbus, all important business and mining centers.

From Carson City to

Localities.	Miles.	Courses.
Genoa.....	12	S
Silver Mountain.....	45	S
Wellington's Station.....	50	S E
Pine Grove.....	75	S E
Walker Lake.....	85	S E E
Cambridge.....	80	S E
Bodie.....	117	S S E
Aurora (Esmeralda).....	105	S S E
Belleville.....	150	S E
Candelaria.....	158	S E
Columbus.....	165	S E

From Bodie to

Aurora.....	12	E N E
Mono Lake.....	10	S
Bridgeport.....	14	N W
Castle Peak.....	25	W
Mountain View.....	40	S W
North Fork.....	45	S W
Minaret.....	55	S W
Buckeye.....	26	W
Tioga.....	35	W
Homer.....	38	N W S W
Prescott.....	40	W S W
Lake.....	50	S
Laurel.....	53	S S E
Deep Wells.....	18	S S E

From Aurora to.

Pine Grove.....	24	N N W
Cambridge.....	13	N
Walker Lake (south end).....	40	N E
Belleville.....	60	E S E
Columbus.....	75	E S E
Benton.....	42	S S E
Indian.....	45	S S E
Bishop Creek.....	38	S S E
Independence.....	120	S S E
Cerro Gordo.....	100	S S E
Darwin.....	180	S S E

From Columbus to.

Candelaria.....	7	W
Belleville.....	45	W
Black Mountain.....	25	W
Marietta.....	30	W
Excelsior.....	25	N W
Clarendon.....	25	N W
Silver Star.....	32	N W
Walker Lake (south end).....	47	N W
Santa Fe (formerly Volcano).....	40	N W
Gillis Mountain.....	36	N
Grantsville (Alexander mine).....	68	N E
San Antonio.....	65	N E
Montezuma.....	45	E S E
Silver Peak.....	47	E S E
Lyda Valley.....	60	S E
Gold Mountain.....	75	S E
Fish Lake Valley.....	18	S
Sylvania.....	40	S
Indian Queen.....	25	S W

Following the Railroad.

Starting from Carson City, the capital of Nevada, and following the Carson and Colorado railroad, penetrating the mining regions to the southeast, we arrive 20 miles out at the Pine Nut mountains, the first range that the road crosses. These mountains abound with gold, silver and copper-bearing lodes, some of which have been extensively developed and proven to contain large quantities of fair grade ores. On their easterly slope occur heavy veins of copper, some of which have been opened and worked with excellent results, a good deal of bluestone, for use in the Dayton reduction works having been made from the copper obtained here. With the cheapened transportation arising from railroad carriage, the richest portions of these ores will now be shipped to other market instead of being manufactured into bluestone, for which there are but poor facilities at the mines.

These mountains crossed, we arrived at Wabuska, 43 miles from Carson City, 35 from the Mound House western end of this road and junction with the Virginia and Truckee railroad. Wabuska is the shipping point for Mason valley on the West Fork of Walker river, and 13 miles distant to the southwest. This valley contains a large extent of good farming land on which fine crops of barley and alfalfa are raised with the aid of irrigation. Beyond this, the road passes for a number of miles through a country having hardly any agricultural resources other than grazing, the bunch grass growing sparsely everywhere affording considerable pasturage.

Arriving at the north end of Walker Lake we reach a point on the railroad nearest to

The Pine Grove, Lake and Cambridge Mining District.

Distant from 10 to 40 miles, Lake district lies on the easterly slope of the high mountains that border Walker lake in the west, Pine Grove and Cambridge being over the range, the former situate six miles west of the East Fork of Walker river and the latter on that stream but further to the south. These are all gold bearing districts

the ore being mostly free and of pretty good grade. In Pine Grove and Lake, wood is in tolerable supply, water scarce. In the Cambridge district these conditions are reversed. A ten stamp mill owned by Ex Governor Blaisdel has for some years past been making in this district a profitable production of gold, over 200 acres of land being also under cultivation here. At Pine Grove two of the several mills erected there have been kept running pretty steadily of late and the camp after a long season of depression seems to be undergoing some improvement. The railroad passes to the east of

Walker Lake.

A sheet of water about 31 miles long, from six to eight wide, and in some parts very deep. Walker river, in the summer when the snow on the mountains is melting, is a large stream. It discharges into this lake at its north end, keeping the water here nearly fresh, though further south it is so strongly impregnated with salt and alkali as to be unfit for use. Salmon trout are taken in considerable numbers at the north end of the lake. This is a palatable fish, and forms the staple food of the Indians, many of whom live on a reservation along Walker river, a few miles north of the lake. Three miles south of Walker lake is located

The Town of Hawthorn.

Shipping point on the railroad for Aurora, Bodie, Sweetwater, Bridgeport and other localities to the southwest, connection being also made here with the stages for all these places. A great deal of freight is handled here, a good wagon road having been built connecting the station with Aurora and Bodie. The project of building a railroad from Carson City to Bodie by a more direct route, once talked of, has, since the construction of the Carson and Colorado railroad, been abandoned. Situated in the mountains, 10 miles west of Hawthorn, is the Mount Cory mine, located on a lode reported to be over a hundred feet wide, and carrying much good ore. This we fully described in the PRESS of Oct. 23, 1882. Twenty-five miles further on, and bearing a little to the east of south, is

The Town of Luning.

Containing about 100 inhabitants, and like Hawthorn, built up since the advent of the railroad. Luning is already an active hamlet, and must become ultimately a place of large business, being the point whence a number of prosperous and very promising mining districts obtain their supplies, and from which they ship their ores and bullion. The mining districts tributary to Luning are the Santa Fe, Gillis Mountain, Paradise, Downeyville, Clarendon, Garfield, Silver Star, San Antonio and Excelsior. With the exception of Garfield, these districts were all organized from 10 to 15 years ago. For several years at first a good deal of work was done here, but owing to the expense of freighting in goods and the consequent cost of supplies and labor, operations were gradually suspended until the country became nearly depopulated. With the coming of the railroad, population is returning, and business everywhere beginning to pick up again. As much ore, both silver and copper, is shipped from Luning, the Melrose Smelting Co., of Oakland, have an agency here filled by Geo. W. Darwin, Jr., a capable assayer and a man otherwise well fitted for the business. In buying ores the following plan is observed: A valuation is placed on the ore delivered at the depot, the shipment made, and in a short time the coin is returned and paid over to the prospector, thus enabling him to develop his mine and at the same time receive the benefit of reduced rates of transportation.

The Santa Fe District.

Luning and Soda City seem to be the center of a broad mineral belt. Five miles from Luning to the east lies the Santa Fe district, where work is progressing in a number of good prospects, only one of which is in silver ore, the others being copper. The Lotta, a small vein, but very rich in silver and galena, is now being worked actively. Of the copper mines in the district, Copper King, Illinois, Sweet Vengeance, Calamity, Black Diamond, Wall Street and Stone Cabin are the principals. Among the first locations made here was the Copper King, on which the present owner proposes soon to erect two smelters of moderate capacity. The croppings on this lode are large, and it will undoubtedly prove to be an extensive mine when fully developed. It can be worked at a good profit with the present rates of transportation and fuel, and is rich enough to warrant the owner in so pushing work as to make it a paying proposition at an early day. The Illinois claim, in this district, has been prospected by two shafts, the one 10 and the other 40 ft. deep. The lode shows a width of 50 ft. on the croppings, though no crosscuttings have been made to show the width below. Ore assays from 16 to 60% copper; average, about 30% of the Sweet Vengeance, about the same may be said as of the Illinois. These deposits of copper ore and the so-called silver caves at Downeyville have brought a number of experts and other classes of mining men into the country, among whom I notice J. H. Crossman, J. W. Gashwiler, Mr. Bowie and S. E. Holcomb, of San Francisco, and J. W. Mills, Prof. J. H. McChesney, of New York.

The Downeyville Mines.

Considerable lots of bullion are arriving at Luning from the Downeyville silver mines, 35 miles to the east, where a new furnace, of 20 tons capacity, has been erected. This furnace started up Oct. 7th, and run until Oct. 14th, during which time it produced 40 tons of bullion,

worth \$305 per ton, in total value \$12,200, a very satisfactory result for a furnace of that capacity; 13 shipments, prior to erection of the furnace, amounted to 3,437 bars bullion; net receipts over all expenses of 13 shipments, \$35,085.97. It is estimated that there is ore enough in sight in the two caves in the Downeyville mine to keep the present smelter running three years, without further ore developments.

The Garfield District.

Situated six miles west of Luning contains a large number of promising lodes. The principle mine being worked here is the Farrington, which employs quite a large force of men. The ore, a chloride and bromide of silver, is sent to Belleville for reduction. Among other good looking claims here are the Lotta, Delaware, No. 1 and 2, Honest John, and Dolly Varden, on all of which work is being prosecuted.

Gillis District.

This district which adjoins Garfield on the north abounds also with good mineral indications, some of which are being actively developed. In the Gillis district six miles north of Luning are the Middlesex, Bay State, Yellow, and South Mountain mines, all being prospected and making a fair showing of silver ores. A custom mill here is much needed and would pay well.

Soda City

Twelve miles south of and next station to Luning, derives its name from the springs located here and of which there are two, only a short distance apart, the one hot and the other cold, chemical analysis shows the water of these springs to contain soda, magnesia, iron and borax in such quantities and proportions as render it valuable for medicinal purposes. As a good hotel has been erected and bathing facilities provided here, the place is likely to become a favorite resort for invalids, such as have already tried the efficacy of this water having been greatly benefited thereby. This hotel is owned and kept by Martin Brazanovich, who has already made it very popular with the searchers after health as well as with the traveling public. At this place the Esmeralda Copper Co. have put up a smelter of 30 tons capacity daily. They employ 23 men at the furnace and 30 at the mine; are working ore from Blue Light claim, which gives average assays of 17% copper; bullion product from five to five and one-half tons per day. They haul their ore 12 miles, and can work it at a profit, giving an assay of only 12%. They have a side track from the railroad to the smelter, by means of which coke is unloaded there, the bullion shipped on return cars. Supt. Center has charge of the works, and is making such success that copper production has become the absorbing theme here. It is a peculiarity of many of the metalliciferous veins in the districts around Luning and Soda City, that, although small, they carry rich ores from the surface, thereby enabling men of limited means to work them to advantage. The miner can get out small lots of this ore, take it to Luning and there sell it, getting his cash in a few days. In this way, he is able to open his claim, support himself, and often make some money besides without the aid of capitalists.

At Rhodes Marsh.

Five miles southeast of Soda City, and 142 miles from the Mound house, occur extensive deposits of the borates of lime and soda, common salt and other saline substances. A large building has been erected here, which answers the several purposes of railroad station, warehouse and refinery. The works are run by the Nevada Salt and Borax Company, who now employ 40 men, and expect soon to largely increase the number. They make one ton of refined borax, and ship large quantities of salt daily. In the manufacture of borax, they use 24 large tanks, of 3,000 gallons capacity each. These are made of galvanized iron. Sheets of the same material are hung in the tanks, which are filled with the concentrations or fluid extract of the borates. The latter are taken up dry from the marsh, placed in large receivers, and dissolved by the action of steam, then turned into the tanks through pipes.

The borax forms in crystals on the sides of the tank, and on the sheets of iron called 'hangers,' to the thickness of three-fourths of an inch. This process requires for its completion about six days. The fluid is then drawn off by means of a siphon, leaving the glittering crystals adhering to everything that was beneath the surface. To this marsh, which is six miles long and five wide, a railroad three miles long has lately been built, for the purpose of hauling the salts from the pits, which are excavated to the depth of three feet, or through the strata of salt. Under this the brine is found, and fills the pit to the depth of 8 or 10 inches. The brine evaporating, leaves the pure white salt, which is taken out and piled up on the sides of the pit, which immediately fills as before. This operation is repeated three times each year, many pits producing several tons each every season. Some of the salt thus obtained is dirty and unfit for domestic use. This is shipped to the quartz mills. The pure white is finely ground in a mill and put up in sacks ranging from 3 lbs. to 180 lbs. in weight. The present Superintendent, J. C. White, proposes to construct long pits, or canals, on each side of the railroad, thus saving labor in handling the salt, which can then be loaded from the pit to the ears. One thing remarkable is the fact that fresh water is obtained on the edge of the marsh in wells sunk below the level of the salt. In the southern, or dry part of the marsh, a spring boils up containing 5% borax.

At Belleville,

Next station on the railroad, is located the two mills of the Northern Belle Mining Co., of 20 stamps each; also large furnaces, the ore from this company's mines requiring to be roasted. The ore, of which about 65 tons are reduced daily, is brought to the mills from the mine, at Candelaria, eight miles to the southeast by rail. Belleville, the largest town in this section of the country, is a little dull at present, as but one of the company's mills is now running.

Candelaria.

This is the present terminus of the Carson and Colorado railroad being 158 miles from its initial point at the Mound house, eight miles north east of Carson City. Being in the vicinity of the principal mines in this region, Candelaria is an active place, and likely to grow with the further development of these mines, of which there are a great many in the mountain lying to the south of it. Although a great deal of prospecting has been done here in former years, there is not as much going on now as the promising appearance of these mines would seem to justify. The Northern Belle, located here, is undoubtedly a first-class mine with others seemingly as good in the vicinity. This town has heretofore labored under the disadvantages of scarcity of wood and water and of dear transportation, all of which are now in a measure removed, the railroad having cheapened the carriage of wood and freights, and works having been constructed for bringing in water through iron pipes laid down to the White mountains, 14 miles distant. These pipes which have been laid under ground to protect them against frost, traverse a very rough country, crossing at one point a depression 900 ft. deep. Seven miles southeast of Candelaria brings us to

Columbus,

For a long time the largest, as it was also the earliest settled town in this section of country. For the past few years its business has been on the decline, having been drawn away by Candelaria and Belleville. At one time there were several mills and roasting furnaces in operation here, but at present there are none. When the railroad comes to be advanced to this place, as it probably will be, business will revive, as there are many good mines about it, there being also an extensive salt bed in the vicinity, where any quantity of impure salt can be gathered by merely shoveling it up. The old town abides its time, its population and business dwindling away in the interim. Twenty-five miles to the southwest is situated

The Indian Queen Mine.

A dividend paying institution, with an excellent record, having paid its way from the first. The success achieved here has, however, been due as much to its superior management, under John Howell, general Superintendent, as to the merits of the mine itself. The ore, though rich, is debased as badly as ore can be; yet so thoroughly is it desulphurized and chloridized, by roasting in the Howell furnace, that 95% of the pulp assay is saved in working. This mine, which has been turning out bullion at the rate of about \$100,000 per year, has made a total production of nearly \$1,000,000, a fair proportion of which, has consisted of net profits. The property is well developed and unfitted, being opened up to a depth of over 400 ft., and supplied with a five-stamp mill and roasting furnace of the improved Howell patent. Large reserves have been established here, there being ore enough in sight to keep the mill running for a long time. Lying off to the southeast, are situated the extensive borate fields of Fish Lake valley, with the Silver Peak, Red Mountain, Deep Spring, Lyda Valley, Palmetto and Sylvania mining districts still further on in that direction. Many of the mines here have been well prospected, and are capable of making a large and profitable production of bullion, under a moderate expenditure of money.

The Montezuma District.

Lying 45 miles E. S. E. of Columbus, is one of the oldest and most important in this entire region of country. The first mineral discoveries were made here nearly 20 years ago, and so firmly were the original prospectors convinced of the value of the deposits that they remained in the country continuously, despite its remoteness, isolation and the hostility of the savages. The most of the locations made in this district belong to the Shawmut company, who own here a series of some 30 claims, all more or less prospected and nearly one-half of them developed with thoroughness and system. Ten or 12 of these properties may be considered first-class mines, large bodies of splendid ore having been opened up in each one of them. Great quantities of this ore have been raised and are now lying on the dumps at the mines awaiting facilities for its reduction. Some of this is milling ore, though the bulk of it requires to be treated by smelting as it carries from 20% to 30% lead with an average of about \$60 per ton in silver. Some 18 months ago the Shawmut Company put up a large smelting furnace at a point convenient to timber and also to their principal mines, there being, as was then supposed, enough water at this spot for all needed purposes. Shortly after they had completed their works, however, the water supply failed in a sudden and most unaccountable manner, compelling them to shift the site of their smelter down on the edge of the salt marsh five miles to the west, where they are about to rebuild it, and where they will have plenty of water, though they will have to haul their ores and charcoal somewhat further than before.

When this company shall have recommenced the work of reducing their ores, they will be able to make a large uninterrupted and profitable output of lead-silver bullion, their stock of ore being high grade, all sufficient in quantity, and the business under an exceptionally capable management. But for the above mishap which could not have been foreseen nor guarded against, the company would a year ago have been in the receipt of handsome dividends.

The Inyo County Mines,

Which cover a vast extent of country, have suffered still more by reason of their isolation and difficulty of approach than those of south-eastern Nevada. Consequently, they will receive corresponding benefits from the Carson and Colorado railroad, which is now being pushed rapidly towards them. If the road had only the mines in this region to depend upon, they alone wouldulti-

The Soda Industry.

The Reno Gazette gives the following description of the process by means of which the natural soda produced by the waters of the Ragtown lake, Nev., is prepared for market. The soda at Soda lake, three miles east of Ragtown, Churchill county, is very hard and crystallizes differently from most of the soda in Nevada. It is very pure, but the solar heat is not great enough to reduce it. Griswold & Epperson have found that by heating it to 500 degrees the quality is improved, but the quantity lessened by loss of water and excess of carbonic acid. They have just finished a reverberatory furnace with a hearth of iron plates, under which are two side flues and a center return flue to the stack. By this arrangement the heated products of combus-

Patterson District, Mono County.

The Sweetwater Mines.

Editors Press: - By request of your agent, L. L. Woodmansee, I send you a few items concerning the new and promising district of Patterson.

There is but one mill here, and that a five-stamp one, owned by the Summers Bros., and to which they are going to add another battery of five-stamp and pan room to accommodate their present engine being large enough to drive that amount of machinery.

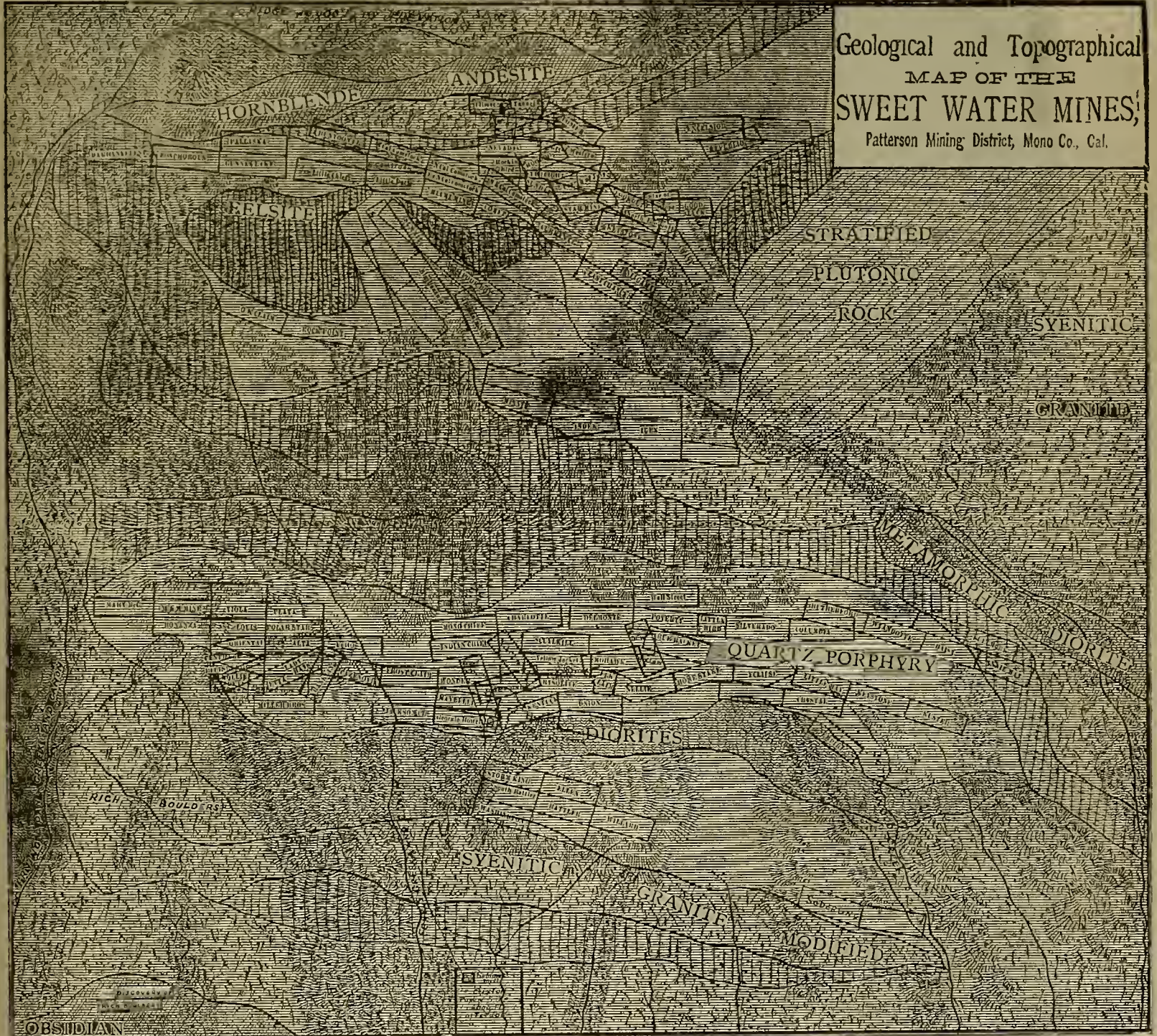
Ore to supply the mill is packed on mules from the Kentuck (also the property of the Summers Bros.), a distance of about two and one-half miles down a steep trail. A wagon road could be built or a tramway that would

hundreds. Choice specimens from the Lady Hayes have assayed \$2,000. Quite a number of mines are bonded and some to large companies. If there are any sales and capital gets into the new camp we may look forward to the time when it will be the best camp on the coast.

Now, we will step back two miles farther into the mountains and on to what is called the head of Sweetwater canyon, there we find a group of mines extending over two miles in length with most flattering prospects.

I would like to take up each one of the mines that have the real merit according to actual showing and speak of their merits and demerits; but I have written several letters without getting information I desired, so I am not at this writing able to do anything like justice to the occasion.

The map which I send you is through the



mately afford it an ample support, as they are not only numerous, but capable of being rendered largely and profitably productive. The road, within the limits of this county, will traverse nearly a hundred miles of rich mineral territory, all of which must become tributary to it, as soon as completed, and which even now is affording it a large amount of business.

WORK FOR MINING RECORDERS.—The late amendment to the act creating Mining Recorders, says the *Tuscarora Times Review*, compels them to do more work, as it provides that it shall be the duty of every Mining Recorder of the State of Nevada, on or before the first Monday in January, April, July and October in each year to transcribe into a suitable book, and to deposit with the County Recorder a full, true and correct copy of the mining records of the respective mining district for the three months next preceding, duly certified under oath. The County Recorder shall record the same in the county records of his county, and shall receive the sum of one dollar for each and every notice,

tion are brought in contact with three times the length of the hearth, which is twenty-one feet, thus obtaining a great economy in fuel. Its capacity is three tons per charge, and it is expected that three hours will dry a charge. They have 400 tons on the shore of the lake and will be shipping to San Francisco as soon as the furnace dries. Captain Moger, of Reno, was the builder of the furnace, and it is unnecessary to say it is a fine job. It was built under the supervision of W. D. Linton, of Wadsworth, who made the plans. There are two lakes a quarter of a mile apart, but they are entirely different. The one where the furnace is located three-quarters of a mile across, and is estimated to contain 500,000 tons of soda. The other is about 700 feet across, and though it has been worked for 19 years there is no visible diminution of the mineral. It contains some very beautiful crystallizations.

BULLION shipment from Butte Montana, now average \$120,000 per week, and the copper matte shipment are maintained equally well,

expedite the transportation of the ore very much.

The Kentuck is prospected down to a depth of 400 ft. and the ledge there is splendid, showing it to be permanent. Then going north across the ridge and in the line of the Kentuck we find the home stake in the canyon about 1,600 ft. below, showing the same quality of ore; what can we say from this, but that the mines will be permanent to that depth, viz: 2,000 ft.

There are many other locations here as you will see by the map I send you, which is but a bird's eye of the country and showing its geological formation and the relative position of the different mines.

Now, we will step across another deep canyon to the south of the Kentuck and around the summit of Mt. Patterson. There we will find another group of locations, of which the M. & M., Viola, St. Louis, Alta, Lady Hayes and others are noted. Here we find good ore of high grade, some of which assays up into the

kindness of Mr. A. Soderling, who is a thorough assayer though is not very expert with drafting instruments; yet, the map is a very good bird's eye view of the topography of the district. The publication of the map will be of considerable interest to the mine owners and the public; and as I think the camp must come to the front sooner or latter, all that is done to attract the attention of the public and capital there is of mutual benefit.

I am sorry that I could not go into more detail. However, if there is anything I can offer in the way of answering any questions that I may be able to, it will be with pleasure.

G. S. HAWKINS.

Carson, Nevada.

The Montano copper produced by the Parrot smelter is sent direct to the manufactory of Thomas Wallace & Sons, where 11,000,000 pounds of the metal are annually consumed

Prehistoric Footprints.

The Remarkable Tracks Found in the Rocks of Carson Quarry.

Not long since some considerable excitement was created by the discovery of supposed human footprints of colossal size in the quarry yard of the State Prison at Carson, Nevada. There are unmistakable tracks of elephant, horse, bird and deer, and other tracks somewhat puzzling in their outline, but bearing a strong resemblance

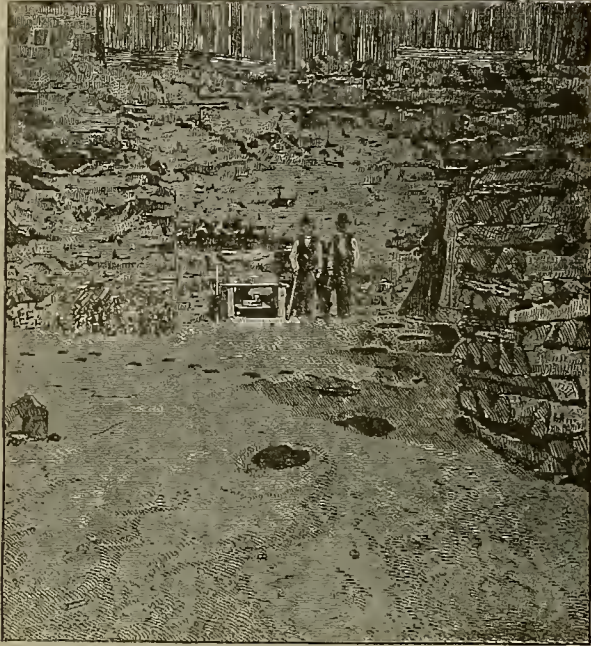
cliffs, 10 to 30 ft. high, on which the nearly level strata are well exposed. (Figures 1, 2, 3, 4). In front is placed the prison building, forming the fourth side of the quadrangle, and the cleared space forms its yard. The stone thus removed has been used in the construction of the prison and other public buildings of Carson.

The strata exposed in this quarry, says Prof. Le Conte, consists of heavy-bedded grayish and creamy sandstones, separated by thin layers of shale. The sandstones, in many places, especially in the eastern cliff, are strongly affected with cross lamination, indicating deposit by rapid, shifting, overloaded currents—in other

of about 60 ft. This hill is formed of sandstone which had its origin in the detritus brought by wind and water from the Sierra. This point was chosen with a view to utilizing the labor of the convicts in quarrying stone for building purposes. As a result of this quarrying, the stone has been removed from an area of about one and three-quarters acres, and to a depth varying from 15 to 32 ft., showing the hill to be composed of layers of sandstone alternating with seams of clay.

"It was known that animal remains had been discovered in the above-named quarry, but no special attention seems to have been called to

time the shore of some lake, or perhaps pond, local and isolated, as its level was above that of Lake Lahontan. Presumably we stand on the shore of this ancient pond or lake, and as we look about us we see the footprints of a variety of animals, among which we recognize those of the mammoth, the deer, the wolf, of many birds, of a horse, and most important of all, the imprints of the sandaled foot of man. There are six series of the tracks of man, each being represented by a number of footprints (from 8 to 17), in regular order, and each showing more or less plainly the imprint of a sandal. Besides this, in one of the series the form of the



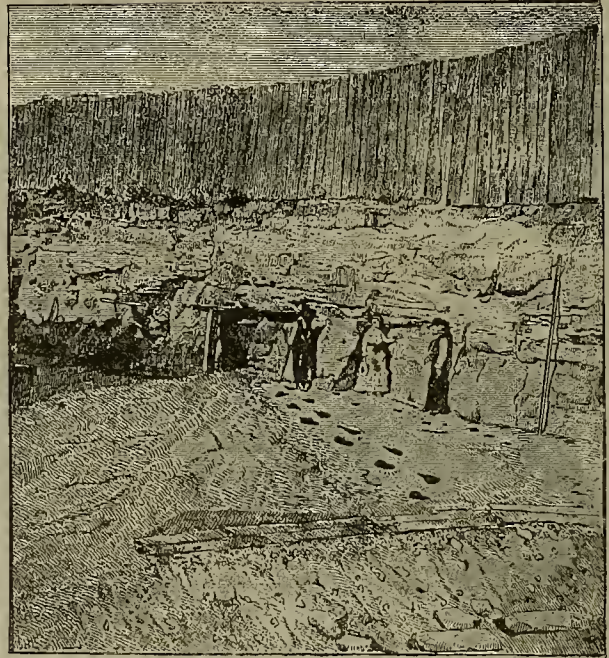
NO. 1.—MAMMOTH TRACKS.

blance, in many respects, to those which would be made by a gigantic man. The scientific world became greatly interested in these tracks, and several members of the California Academy of Science visited the quarry and inspected the tracks. Those who read papers on the subject at the Academy were, Dr. H. W. Harkness, C. D. Gibbs, R. E. C. Stearns, Prof. Joseph Le Conte and J. R. Scupham. Careful measurements were taken by Mr. Gibbs, and plaster casts were made by D. Harkness. We reproduce some of the drawings made by Mr. Gibbs which show the appearance and position of the curious tracks; and also give engravings

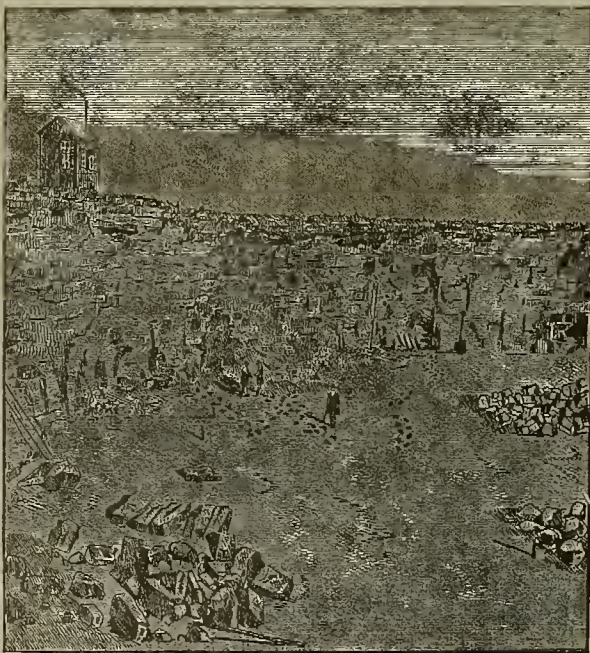
words, *river flood deposits*. We have, here, therefore, probably the mouth of an ancient stream. The stone has been removed down to an even shale stratum, or rather to two shale strata, about two feet apart, which form the floor of the prison yard. These shale strata are the track-layers. The upper track-layer forms the floor of the upper or eastern part of the yard; then there is a drop of about two feet to the lower track-layer, which forms the floor of the rest of the yard. The whole area thus cleared is literally covered with tracks of many species of birds and mammals. (Diagrams 1, 2 and 3). The area has been cleared, and the

fact until the appointment of the present Warden, Wm. Garrard, under whose quick intelligence, and by whose energy, a systematic effort has been made to collect and preserve these fossils. And not only this, he, together with Mr. Hanks, the Sheriff of Storey county, determined to have the situation carefully examined, and to this end they opened correspondence with the Curator of our Geological Museum, C. D. Gibbs. At one of the recent meetings of the Academy, Mr. Gibbs read the correspondence, which so impressed the members that it was determined at once to visit the locality. The formation, to which allusion has been made,

sandal differs markedly from the others. The first of these series which we examined is to be seen emerging, as it were, from the eastern side of the yard, where the cliff is 15 ft. in height above the tracks. This series consists of 12 tracks, to which number four were subsequently added by tunneling into the rock. These tracks were evidently made in a layer of sediment of perhaps two inches in depth, for below this layer we find the compact sandstone. In each instance the mud had been raised by the pressure of the foot into a ridge which entirely surrounded it. Each of the imprints furnishes us with evidence, as we believe, that the feet of



NO. 2.—FOOTPRINTS, SERIES NO. 1.



NO. 3.—SOUTHWEST CORNER PRISON YARD.

from photographs showing the general appearance and surroundings.

The Nevada State prison is situated on the plains of Carson, three or four miles from the Sierras. The main building has been placed at the base of a low rounded hill, sloping to the plain on all sides except to the south, where it abuts against a neighboring ridge of much older rocks. The hill consists of regular strata, nearly level to the eye, but really dipping 2° or 3° to the west, and it is evidently a remnant left by erosion, of a much more extensive deposit. It has been cut into on one side (the northern) down to the level of the plain, in such wise as to form a nearly level quadrangle about 100 yards square, surrounded on three sides by vertical

tracks exposed and trampled over by men and horses for 8 or 10 years, without attracting any special attention. Their importance was first recognized by the intelligent Warden, Major Garrard. To the stony hardness of the strata alone, do we owe the fact that they have been preserved at all.

We have not space to go into all the details which have been developed concerning these tracks, but will quote a few extracts from the papers read before the Academy. Dr. Harkness says:

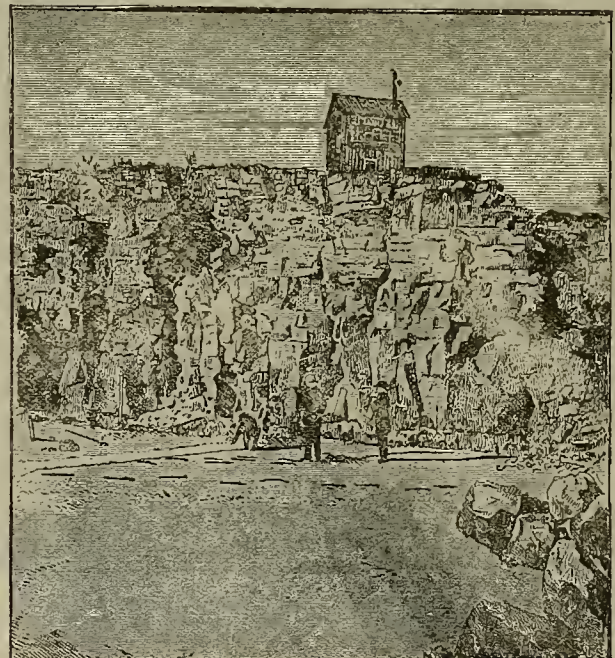
The prison was built about 20 years since, on the extreme point of a hill having an elevation

is called by Clarence King in his geological survey of the fortieth parallel, the "Lower Quarternary." Referring to this region, he says it is composed of sandstones and clays worn down from the adjacent high mountains and deposited in the water and on the shores of a lake of many hundred miles in area, that at one time extended along the eastern base of the Sierras and to Central Nevada, and having an elevation of 4,388 ft. above the sea level. Pyramid, Winnemucca and Walker lakes, and the sinks of the Carson and Humboldt are now the lower points of this prehistoric lake, which spread its waters in the pliocene age, and which Mr. King has called Lake Lahontan.

"It also gives evidence of having been at one

the one making the tracks were protected by sandals. In no single impression do we find conclusive evidence of this fact, but when we study them as a whole we find that which is wanting in one is furnished by others which follow."

"In nearly all, the toe portion is well shown, it being as smooth as the work of a mason, for the distance of two or three inches. Backward from the toe we generally find the imprint of the outer portion of the bottom of it. When studied as a whole we can determine with a good deal of exactness the actual length and breadth of the sandal, which we find to be 18½ inches in length, eight inches at the ball of the foot, while the heel is six inches in breadth. In its outline the impression follows clearly th



NO. 4.—BLUFF AT GUARDHOUSE NO. 5, SOUTH WALL.

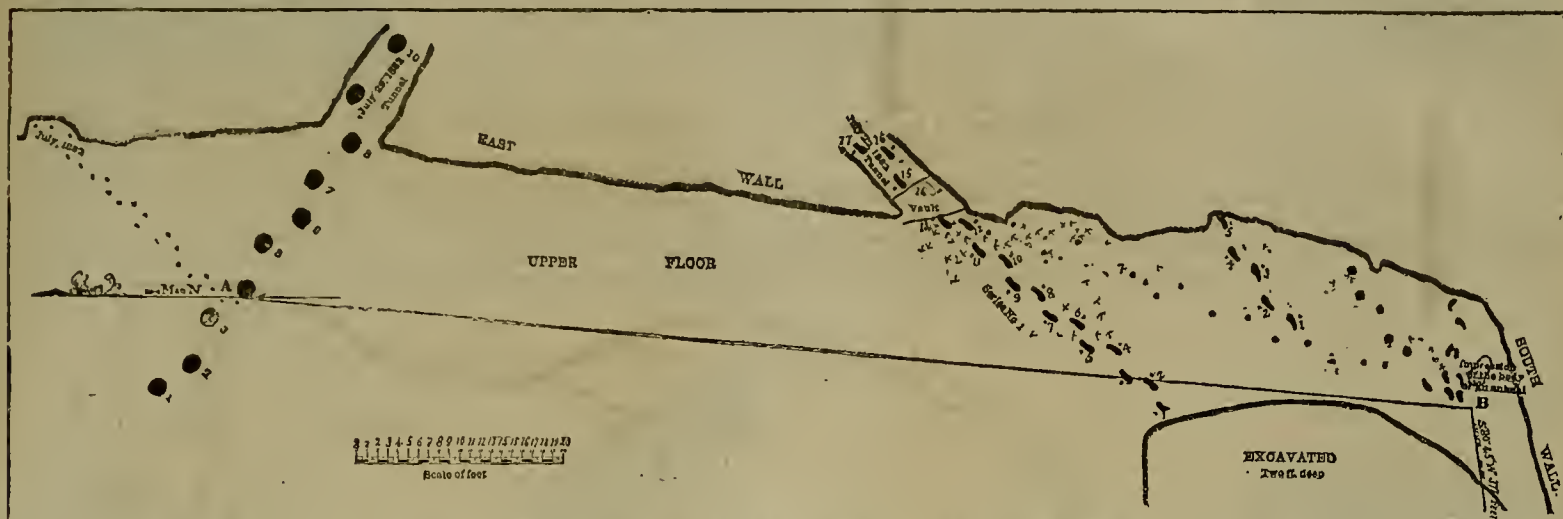
shape of the human foot. From the great toe outward there is a really graceful curve, which draws in towards the heel; while from the great toe inward the line is drawn toward the instep and thence in and outward curve to the heel. In one series this curve is deeper, showing a slightly different form of sandal. The average length of the stride is two feet three inches. The distance between the feet or the straddle is 18 inches, as measured from that center of the sandal of one foot to the center of the corresponding one.

"As before stated, these mammoth footprints were of an average depth of five inches, and had been made in a layer of sediment which is

middle toe from heel, five inches. The transverse diameter of the expanse of the foot, from the extremity of the inner toe, to that of the outer one, seven and a half inches. Step 23 to 24 inches. Another track has a rudimentary toe one and a half inches long, middle toe five and a half inches long, the expanse of the foot eight and a half inches. Step about the same. A round track five inches in diameter, made apparently by some animal of the feline species, is seen going south, and across the human tracks. They are 16 in number. There are also three or four small tracks, made by a wolf or some such animal, and a few deer tracks. All of the above-mentioned tracks are found on the

Series No. 6 has 15 human (?) tracks about the same size as the last; they are going northeasterly, and cross No. 5 about 24 ft. from the west wall. Bird tracks, covering 28 ft. of canvas, cross series No. 2, 3 and 4. These are all shown in diagram No. 2. But there are many more tracks on this floor, both human and animal, that we have not been able to represent. I was instructed by the Academy to take photographs of anything necessary to show the foot-prints and surroundings (eight photographs were taken by C. E. Peterson), also to take measurements, which I did by using two tape lines stretched 18 inches apart, and taking the distance to the center of the heel and toe of each foot. But see:

a fossil jaw of an elephant has been found; fossil teeth of the horse have also been found. Prof. Le Conte inclines to the belief that the supposed human tracks were made by a quadruped, and says: In conclusion, then, the one strong argument for the bi-pedal theory is the apparent singleness of the tracks and the absence of the toe marks, while the one strong argument for the quadrupedal theory is the wide space between the right and left series of tracks. To this may perhaps be added also the size and shape. It seems to me that inductive caution requires that the judicious mind should hold itself in suspense awaiting more evidence. Meanwhile, however, my own mind incline



PREHISTORIC FOOTPRINTS AT THE CARSON QUARRY. DIAGRAM NO. 1.

now so firmly consolidated as to retain a tolerably distinct external outline of the foot of the animal, but owing to the irregular formation of the calcareous deposit referred to, no distinct imprint of the bottom of the foot can be traced.

In the prison yard at Carson besides the above described tracks, those of birds are found in abundance. Most of these tracks show but three toes; in some instances, however, there are distinct impressions of four. The extreme length of the longest toe in any one of these bird tracks is five inches, and the stride meas-

first or upper floor, at the east side of the quarry; and many of them are shown in diagram No. 1.

"Series No. 2 consists of 13 human foot-prints 21 inches long, and 7 inches wide, going in a southwesterly direction until lost in the sandstone bluff at the south wall, which is 22 ft. high at this point. This man had a very peculiar shaped foot, and may be said to have toed the mark, he walked as straight as a surveyor running a line. The quarry is now being worked at this bluff, and we may soon expect more foot-

ing from the nature of the shale formation that the tracks were liable to be destroyed, it occurred to me to obtain copies of the foot-prints on canvas, which I did by marking the outline of the bottom of each track with plumbago, and rubbing the cloth on it, took the impression of each in the proper position, using 90 yards of cloth, and could have made use of as much more if time had been allowed. The foot-prints were photographed by spreading pulverized charcoal on the bottom. But if I had followed the outer edge of the displaced mud, it would have made

strongly to the latter theory. Since writing the above I find that Prof. Cope, in American Naturalist, vol. 16, p. 195, and Prof. Marsh, in a letter to me, regard the strata of Carson Quarry as belonging to the *Eocene Beds*. The age of these beds is still doubtful, some regarding them as upper Pliocene, others as early Quaternary. They are probably uppermost Pliocene. The Carson strata, therefore, are possibly deposits from King's Lake Shoshone, and not Lake Lahontan. From deposits of this age three species of gigantic ground sloths are



PREHISTORIC FOOTPRINTS AT THE CARSON QUARRY. DIAGRAM NO. 2.

ures a little more than two feet. Several very distinct tracks of a deer are to be seen, as well as those of a horse, the imprint of which is the same as that of the horse of to-day. Still other tracks, resembling those of a wolf, may be traced for 20 feet or more, when they also are lost in the cliff; and near the western limit of the quarry there are indications of a large animal having wallowed in the mud.

Diagram No. 3—On a smaller scale is made to represent a portion of the east, west and south walls of the quarry, so as to show at a glance the different series of tracks in their relative position. The lines run are magnetic.

In Mr. C. D. Gibbs' paper are the following notes of interest: Besides the tracks above mentioned, there are numerous others of wading birds, some having but three toes. Length of

prints to be found. This series covers 40 ft. of canvas.

"Series No. 3 contains 15 human tracks, 18 inches long and 7 wide, going nearly west; with the toes turned out, and stepping rather irregular."

"Series No. 4 has 14 tracks 18 inches long, going nearly parallel to No. 2, and crossing No. 3. It covers 40 ft. of ground.

"Series No. 5 extends over 112 ft. of ground and contains 44 human (?) foot-prints 18 inches long and 6 inches wide. But 5 tracks, from 19 to 25, are not distinct enough to represent, the shale, being destroyed by carts handling off the rock. These tracks are irregular in their direction, and disappear under the west wall, which is 32 ft. high."

them three or four inches longer, and four or five inches wider. (Engravings from photographs appended).

Of the photographic views shown, No. 1 is a continuation of east wall to mammoth tracks and tracks of supposed hyena.

No. 2—East wall at foot-prints of series No. 1, and tunnel.

No. 3—View from No. 4, showing No. 5 and portions of south and west walls.

No. 4—Bluff 22 feet high at guard-house No. 5, showing the stratum or upper beach in which the shells *Anodonta* and *Physa* are found. Also the stratum between the floors. The assistant is represented in the act of taking an impression on cloth of the hind tracks."

There is no doubt whatever about the elephant tracks. Since the excavations were made

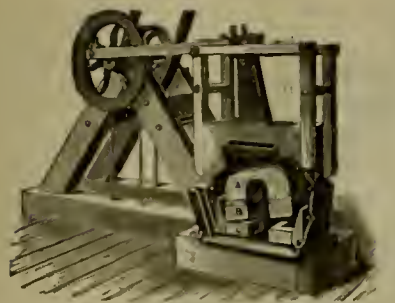
known, viz: Two species of *Morotherium* and one species of *Myiodon*. It is not at all improbable, as suggested by Marsh in his letter, that the supposed human tracks were made by one of these. The size, the stride, the curve and the straddle all agree with this supposition.

CERTAIN telephonic experiments at Havre have resulted so favorably that it is now proposed to establish a regular system between that city and the various vessels at anchor. A pontoon structure, which will form the floating terminus of this curious system of marine communication, will be placed at some distance from the land, and neighboring vessels will send their messages to it.

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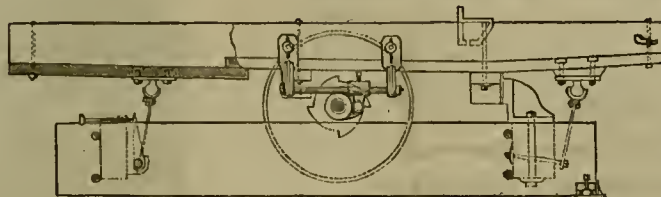


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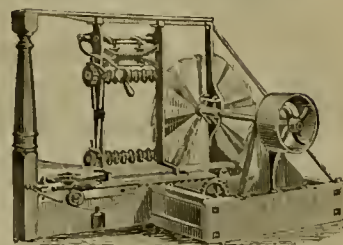


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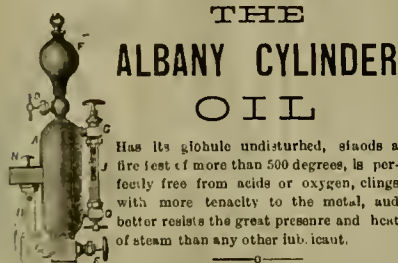
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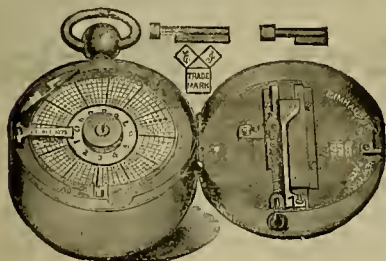
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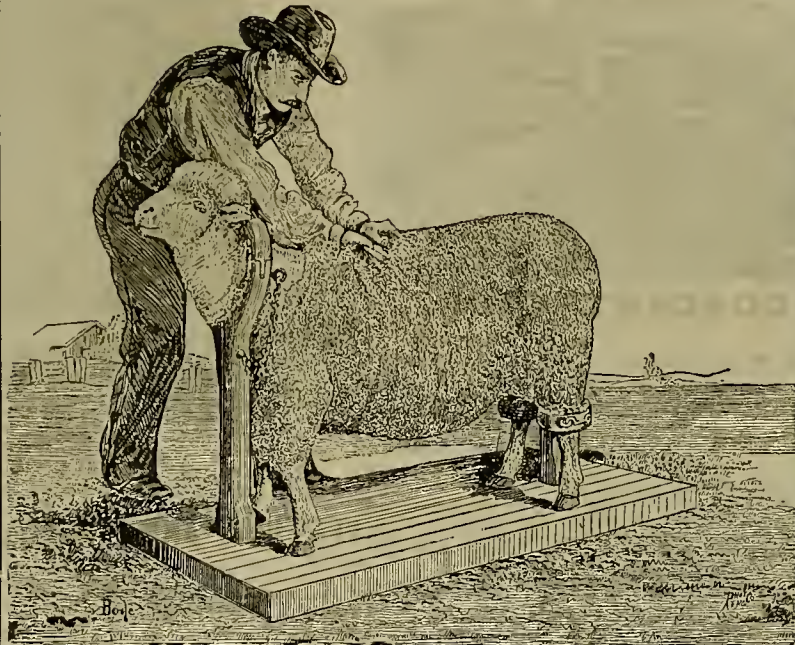


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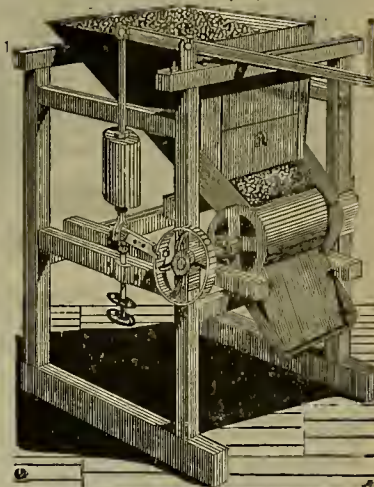
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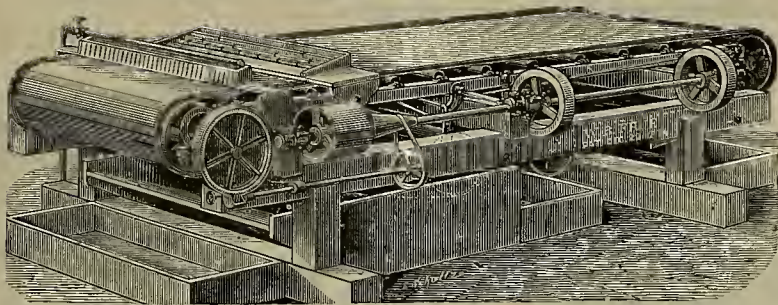
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That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

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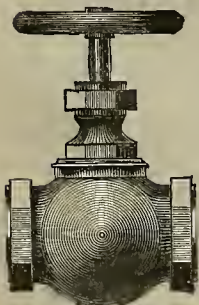
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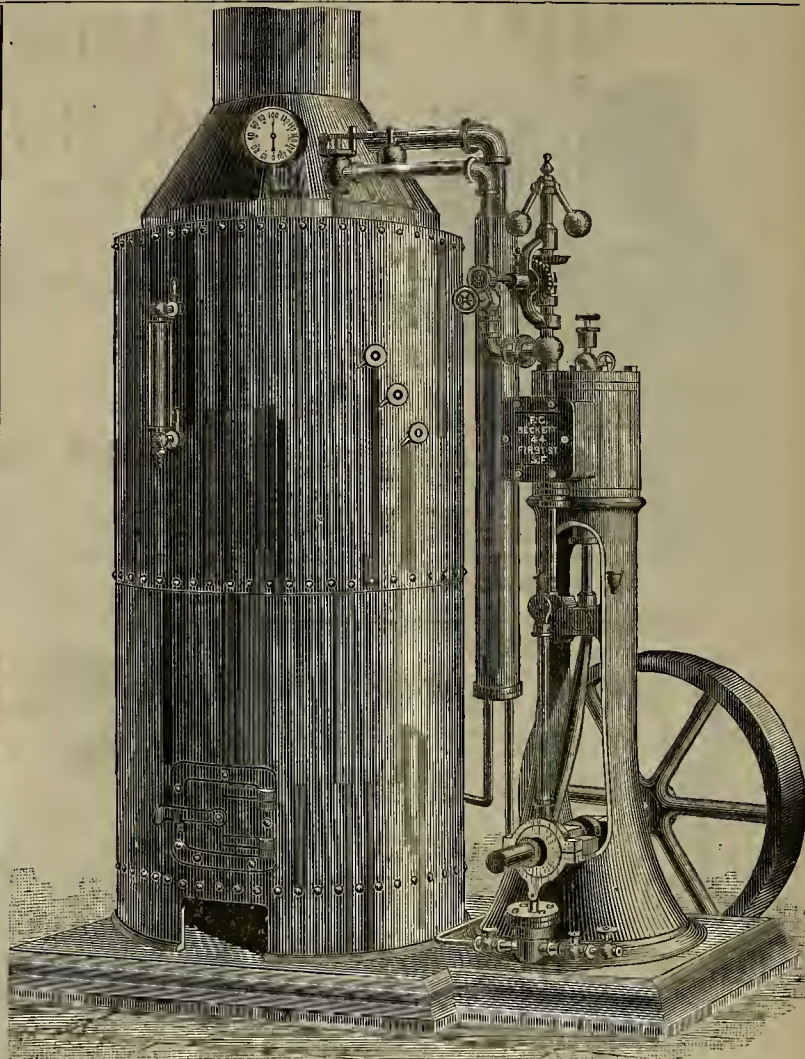
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Notes from Eureka, Nevada.

(CONTINUED FROM PAGE 134).

being run to cut through all of the different ledges, which enters the mountain at its base, near the valley level. It is now in 700 ft, and will be carried 7,000 ft to its terminus. There are three other tunnels being run at different points. In one of these work is being done to develop the mammoth ledge at a point where the vein is nearly ten feet thick, the average thickness of the same being five feet. The surface croppings on some of these ledges are quartz, and on others iron and low grade carbonate ore.

The ore runs from \$25 to \$80 for the second class and \$100 for the first class, and all of it averaging from 30 to 40 % lead.

One of our great necessities is

Additional Railroad Facilities.

which we are promised will shortly be secured for us.

March 2, '81, the Nevada Legislature passed a bill granting a franchise to the Eureka & Colorado River railroad giving right of way from Eureka to the town of Colville, on the big bend of the Colorado river. The franchise, together with a large block of the stock, was subsequently sold to the Denver & Rio Grande railroad company, who broke ground and commenced grading for the new road during the month of August, 1871, and the same has been completed, and ready to lay the track to the edge of Newark valley, near to the southern end of Silverado mountain. On account of the high rates of freight charged by the C. P. R. R. and U. P. R. R. for transportation of rails and construction material, the company express their intention of building from the east end of the road. It is said that they will commence laying rails this spring from Salt Lake, and that trains will be running from that place to Cherry Creek, 75 miles from Eureka, by next August. The line of the E. & C. R. R. leave Eureka by way of the Italian Rancho, crosses the Diamond range of mountains at the head of Pinto creek, thence runs north easterly to the point of Pancake mountain; thence southeast, to a gap in the White Pine range, six miles north of Hamilton, making the distance from Eureka to White Pine about 38 miles. The general direction of the line is east and west. It passes through the most extensive mineral, agricultural and stock-raising country in eastern Nevada. The way tributes to the road in this section of the State will be of almost every conceivable kind, not the least amongst which will be the immense ore and charcoal supplies to the Eureka furnaces. As Eureka has all of the elements for the fluxes required in smelting base ores, such as silica, limestone, iron, galena, etc., this new railroad will be the means of making it a great smelting center. The mining camps of Silverado, Newark, White Pine, Bald mountain and other localities along the line of the road will ship their ores to Eureka for reduction, the excessive rates of transportation, by team, being the only drawback to the successful mining of low grade ores at those places at the present time. High grade ores are now shipped from these camps to the Eureka furnaces, but only in small quantities, as the cost of mining them is too heavy to be made profitable. Railroad transportation of supplies to, and ores from the mines, will lessen the cost of production and carriage to such an extent, that even the low grade ores may hereafter be mined extensively and made to pay large profits.

M. H. JOSEPH.

Eureka, Nev., February 19th.

The Silk Culturists.

The California Silk Culture Society held its regular meeting on Thursday of last week, at the Academy of Sciences. The new president of the association, Mr. W. B. Ewer, read an introductory address, briefly reviewing the past efforts of the association, and offering some encouraging remarks in regard to the future.

It should be more generally known that it was through the efforts of this society at the Philadelphia Centennial, in making a practical display of the work of silk reeling, and of California raised cocoons and raw silk, that the present general movement in the Eastern States was inaugurated. From that small beginning, several large and influential societies have been organized in Philadelphia and elsewhere, through whose encouragement silk growing has received an impetus, and reached a measure of success, which bids fair to grow into an important national industry all through the Middle, Southern and Southwestern States. The labors of these societies have been greatly encouraged by liberal aid from wealthy citizens; hence, greater results have been met with there than in California.

In view of these facts, and of the further fact that California is so much better suited to this industry than the Eastern States, the California society has prepared and published a memorial to the Legislature asking for State aid in their efforts. This memorial will be found on another page, and fully explains itself. It also furnishes a substantial argument why such aid should be extended.

The meeting on Thursday was mainly devoted to a consideration of the memorial, and the ways and means for having it properly brought to the attention of the Legislature, to which body it has already been presented. A commit-

tee was appointed to go to Sacramento to look after that matter.

New members are being constantly added to the society, the regular meetings of which are held upon the first Thursday of each month. The society has silkworm eggs for sale, and is willing to give them away in small quantities to those who are unable to buy, or to such as may desire to experiment in a small way.

Floods and Forests.

The associated press dispatches during the last week from valleys of the Mississippi and its tributaries have been filled with heartrending details of suffering and loss of life and property by floods, which have been higher than ever before in the history of those regions. Thousands of people have been driven from their homes in Cincinnati, Louisville and a host of other towns built upon the banks of the Ohio river, bridges have been swept away and other towns submerged in nearly all the States of the great valley, communication has been interrupted, hardship and suffering have been reported on every hand. The vast volume of water has burst the levees in the lower parts of the Mississippi and flooded towns and agricultural lands. Millions of property have been destroyed, homes overwhelmed, lives lost, and the prosperity and comfort of thousands arrested by angry waters. Generous contributions of money and supplies for the sufferers have shown the tender heart of the nation. The question, however, arises, whence the cause of this unusual visitation; are the people to be at the mercy of its recurrence, or can something be done to check the preceptitious downpouring of the waters in the future. In the midst of the columns of news about the ruin caused by the waters we find the following key to the situation. Murat Halsted, a prominent citizen of Cincinnati, calls attention to the remarkable similarity between the flood in the Ohio river and the recent floods in the Rhine and the Danube. General McClellan, in an interview, says: As a preventive against another flood, the nation must enact laws similar to those in Europe, compelling the replanting of trees as fast as cut off.

This is undoubtedly the secret of the unprecedented rise of the waters in the valley of the Ohio, and it will for years be subject to similar visitations before any remedial measures can reach an effective condition. The denuding of the vast watersheds of the Ohio and its tributaries has been in progress for years, and a condition has at last been reached when the water from the rainfall and melting snows rushes in a body into the water-courses from the naked slopes instead of seeping down through porous forest soils until the surplus not required by the growth of vegetation, gradually finding its way to the ocean. Water rushes from bare hillsides as from a roof; it is held by forest-covered soil as from a sponge, and only on super-saturation does the excess slowly find its way to the lower levels. What has been gained and what lost by the change, and how can the ills of the present condition be obviated? Let a speaker at the recent Forestry Congress at Montreal state the case as we find it reported in the *American Journal of Forestry*:

"We have gained to agriculture for pasturage and for cultivation, a large area of fertile land in the emptied basins of the old reservoirs and mill dams. We have gained pastures and farming lands on the hills. We have gained in the aggregate productions of the region and in population by extending the cleared land. On the other hand we have subjected ourselves to cloud-bursts on the naked hills, which once drank in the descending floods in the porous woodland soils, but now the solid, compact hillsides throw off the floods into the valley at times an irresistible torrent, carrying destruction and death in its course. We have lost in the destruction of untold millions of feet of lumber, sold at prices low compared with present rates, with vast amounts of wood recklessly destroyed; and when we consider the fact that, as a result of our interference with the restorative operations of nature, we have stamped out all prospect of the renewal of forest growths by close pasturing and continuous plowing, it is indeed a question whether we have not lost instead of having gained by the change. Not that we would regain all the land in woods again were it in our power; but by judicious replanting of the waste lands where the woods have been destroyed, the steep and rocky hillsides and ravines that possess but little value for agriculture, we might establish the happy equilibrium, preserve and restore the springs and feeding rills, and prevent a further diminution of the stream. Keep up the proper balance of woodland and tillage, which preserves, in a measure, greater uniformity of climate, humidity and rainfall, while all the time, and for all time, the land so appropriated and occupied will be yielding a rapidly increasing capital and a paying investment in the production of the timber.

How can this work of replanting be done? By the awakening of the whole people to the need of it; by inculcating the advantages of tree planting; by arousing individual and governmental interest and resolutely going to work to secure the desired results. The American Association for the Advancement of Science at a recent session adopted a memorial to Congress which covers many directions in which valuable encouragement can be given to tree-planting. It asks that roadside tree planting be encouraged by deducting the cost from road taxes; that land planted to forest trees be ex-

empt from increased valuation by the Assessors because of the trees; that State money be appropriated for horticultural societies to offer as premiums for successful tree planting and care; that prizes be offered for the best and most practical essays on the subject; that educational institutions be encouraged to establish instruction in silviculture; that laws against wilful or careless forest firing be enacted; that model plantations be undertaken at State expense, and persons trained in forestry; that State Forestry Commissions be established in every State, etc.

Never before did measures of this kind force themselves upon the public attention as at the present. No time should be lost putting forth efforts to preserve existing forests and in replanting every spot in the thickly populated States, which can be spared from regular crop tribute. Let each one consider it his or her duty to do something towards the ends desired.

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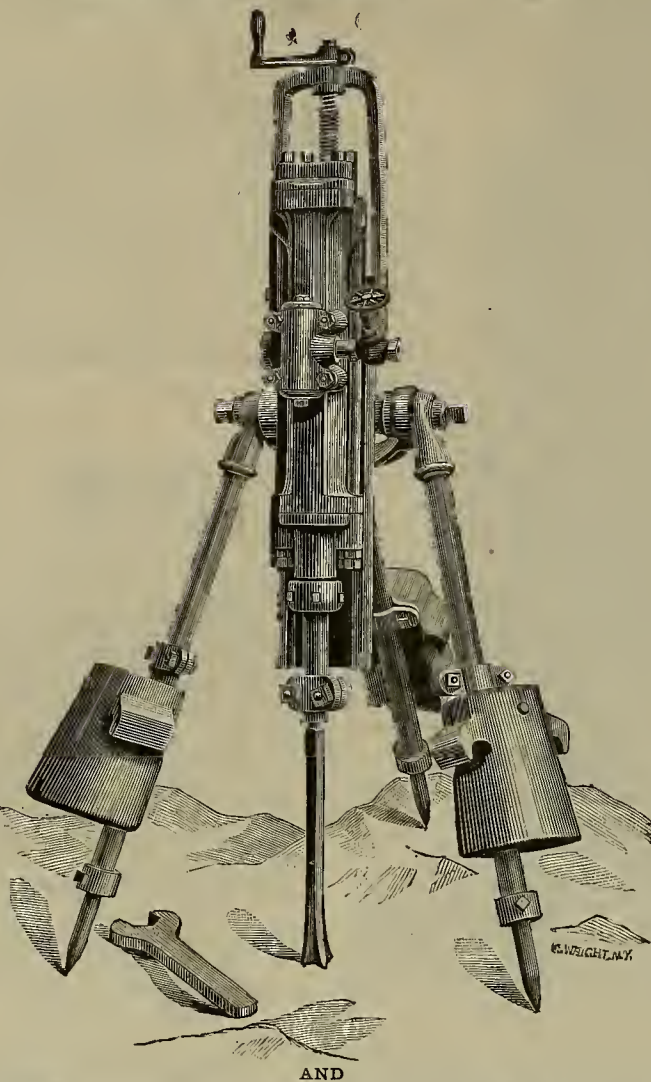
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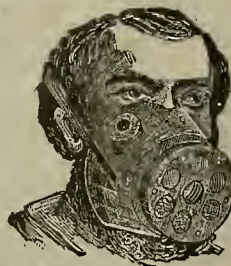
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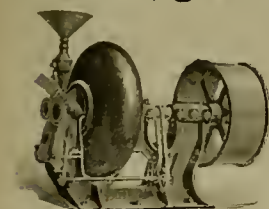
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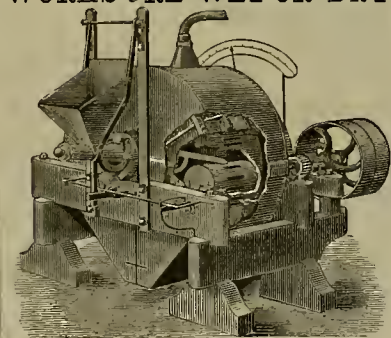
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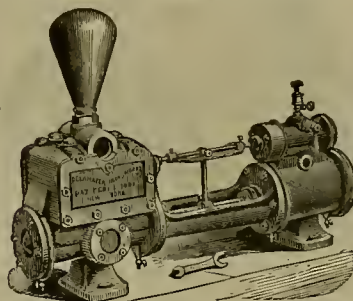
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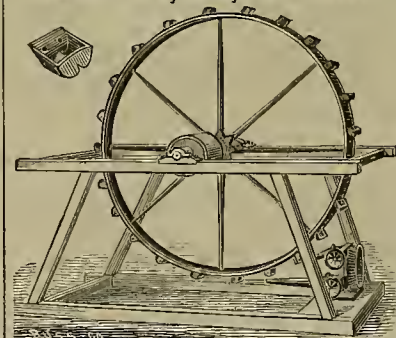
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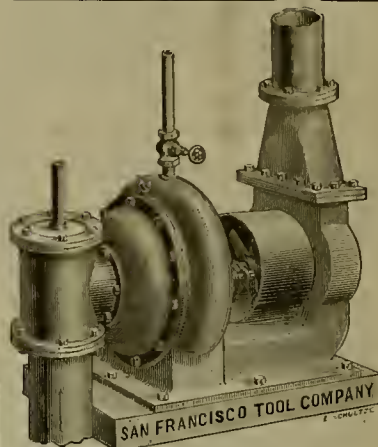
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Clean Concentrations wanted. A party from the East vying a process for working low-grade Sulphurets, will commence purchasing the same as soon as assured of an abundant supply. Cold-bearing Sulphurets preferred, having an assay value of \$30 per ton, or upwards. Address, A. B. WATT, P. O. Box, 2293, San Francisco.

FIGARI & RICHMOND'S BOILER AND TUBE COMPOUND.

We guarantee our COMPOUND to remove all scale and prevent any more being deposited. The COMPOUND forming a glazed surface on the iron, to which no scale will adhere and which preserves the iron. The preparation is strictly vegetable, and is warranted to do all that is claimed for it without injury to the metal. Send for a circular.

H. P. GREGORY & CO., Agents, San Francisco.

Inventors L. PETERSON MODEL MAKER.

223 Market St., N. E. cor. Front, upstairs, San Francisco. Experimental machinery and all kinds of models, tin copper and brass work.

PATENTS AND INVENTIONS

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

WEEK ENDING FEBRUARY 6, 1883.

- 271,792.—STONE DRILLING MACHINE—Jas. T. Clark, Bath, Cal.
 271,793.—INSOLE FOR BOOTS AND SHOES—E. K. Cooley, S. F.
 271,687.—WATER, GAS OR DRAIN PIPE—John P. Culver, Tucson, A. T.
 271,813.—EVAPORATIVE COOLER—Geo. W. Deitzler, S. F.
 271,821.—APPARATUS FOR PURIFYING WATER FOR BOILERS—Chas. Elliot, S. F.
 271,695.—STOCK CAR—Job C. Foster, St. John Cal.
 271,847.—SCREEN CLEANING DEVICE—Thos. Holman, Salem, Oregon.
 271,709.—HAMMER—H. O. Hooper, Fresno, Cal.
 271,853.—BOLTING REEL—J. D. Hurst, Salem, Oregon.
 271,710.—DRIVING CART—E. Hutson & E. Squires, Salem, Oregon.
 271,713.—COUPLING LINK—William M. Jones, Stockton, Cal.
 271,630.—BAG HOLDER—W. E. Shellenberger, Woodland, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press American and foreign Patent Agency, the following are worthy of special mention:

COUPLING LINK. Hilliard M. Jones, of Stockton, California. No. 271,713, dated February 6, 1883. This invention relates to a new and useful coupling-link, and it consists in a metal ring or link with separated ends, in one of which a peculiar latch is pivoted or hinged, the other end of which is adapted to fit into and be secured in a socket in the other end of the link. The object of this invention is to provide a convenient, effective and economical device for coupling any desired number of chains. The special object is to adapt it for use in harness in coupling side and fifth-chains of the forward team to the fifth-chain of the team behind.

STOCK CAR. Job C. Foster, St. Johns, Colusa Co., California. No. 271,695. Dated Feb. 6, 1883. This invention relates to certain improvements in that class of railway-cars used to transport live stock, and known as "stock-cars." The object of this invention is to provide a car in which live stock may be transported and fed with convenience and dispatch during the continuance of the journey without having to leave the car.

WATER, GAS, OR DRAIN PIPE.—John P. Culver, Tucson, Arizona Ty. No. 271,687. Dated February 6, 1883. This invention relates to that class of pipes which are composed of thin iron sheets or other suitable metals, having a layer of asphaltum interposed between the layers of iron, so that when properly formed the asphaltum will fully preserve the iron.

EVAPORATIVE COOLER.—George W. Deitzler, of San Francisco, Cal. No. 271,813. Dated February 6, 1883. This invention has reference to that class of coolers in which the reduction of temperature is produced by evaporation; and it consists essentially in devices and processes for delivering water to the evaporating surfaces automatically as needed, and so as to prevent waste.

HAMMER.—Henry O. Hooper, of Fresno, California. No. 271,709. Dated February 6, 1883. This invention relates to that class of hammers adapted to hold nails by their heads while being started into the material in which they are subsequently to be driven.

REDLANDS.—According to all reports, Redlands colony, in San Bernardino county, is progressing very satisfactorily. The elevation has been found a great advantage during the cold winter, effects of frosts being less than in most other localities. The march of improvements has been kept up, and tree planting and home-making have kept the many colonists busy. All visitors are charmed with the beautiful situation of the lands and other superior advantages. Those seeking homes in the southern country should not overlook the claims of Redlands.

Complimentary Sample Copies of this paper are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give their own patronage; and as far as practicable aid in circulating the journal and making its value more widely known to others and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year.

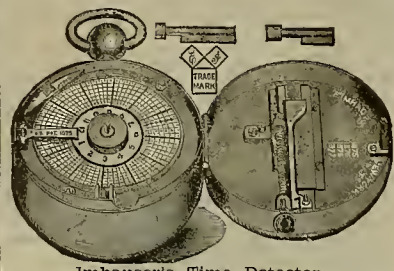
N. B.—Personal attention will be called to this (as well as other notices, at times) by turning down a leaf.

An Improved Time Detector.

We illustrate on this page Imhanser's improved watchman's time detector with safety lock attachment. The marking apparatus in these instruments is placed in the cover of the case, separately from the watch movement, which is thereby protected from injury by dust getting in through the key-hole. This is a great advantage over ordinary watchmen's clocks, having the marking springs for pricking holes on the dial not separated from the time movements.

The safety lock attachment is a recent improvement of great importance, being a safeguard against tampering with the record. It consists of a stationary knife placed inside the cover in such a position that every time the cover is closed or opened the edge of the dial card is cut, making a nick on the rim about one-eighth of an inch deep, and showing the exact time when so cut. From the number of the cuts and their time, it will be easy to detect any tampering by opening the cover. Without this attachment, any detector would not be ascertained against false records by dishonest watchmen.

With the watch there are 12 different keys, which are fastened one at each post where the watchman is to call during his round. Keys, Nos. 1 to 6, mark a figure between the circles 1, 2, 3, 4, 5, 6 on the dial cards, and keys Nos.



Imhanser's Time Detector.

7 to 12 mark a figure on the lines of the circles, so making a clear registration, not a confused one as is the case with other detectors having records made by punching holes in the dial card.

The watchman entering upon his duties in the evening receives the detector locked and in the leather pouch. The watch is previously wound and supplied with a fresh dial card, care being taken to place the nut on the arbor in the center, according to the marks on the nut and arbor. The watch will run about 60 hours.

Arriving at any station, the watchman inserts the key he finds fastened there, through the pouch into the key-hole on the rim of the watch opposite the ring, and turns the key round to the right once, and withdraws it; a figure will be stamped on the dial in such a position as will show the precise time of the registration.

On delivering the watch in the morning, the person in charge can see at a glance how often and when the rounds have been made during the night; whether every station has been visited or any neglected, what space of time elapsed between the different visits, etc.; in short, it tells the history of the night's doings of the watchman.

With a faithful watchman, the risk of loss, either by robbery or fire, is reduced to the minimum; but how to know that the watchman is faithful is the question; for a watchman who deserts his post, or "sleeps on guard" is worse than none at all. The agents in San Francisco for these appliances are Dunham, Carrigan & Co.; and they are in use by a number of firms of this city.

New Incorporations.

Esmeralda Copper Co., Feb. 21. Capital stock, \$2,500,000. Directors: Angus C. McAfee, Frederick Conn, DeWitt T. Biber, John Conry and Hiram D. Tuttle.
Union Iron Works, Feb. 20. Capital stock, \$2,000,000. Directors: Geo. W. Prescott, Irving M. Scott, J. O'R. Gunn, Geo. W. Dickie, H. L. Markey and George Fredericks.
Amargosa Borax Co., Feb. 21. Capital stock, \$50,000. Directors: William Locke, William C. Brown, Thomas W. Chion, George Rouner and William R. Townsend.

SENATOR TAYLOR'S bill amending the bullion tax law, so as to make it what it purports to be, "a tax on the net proceeds of mines," was defeated by a large majority in the Nevada Senate.

REMARKABLE for overcoming diseases caused by impure water, decaying vegetation, etc., is Brown's Iron Bitters.

Our Agents

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

G. W. McGREW—Santa Clara county.
 M. P. OWEN—Santa Cruz county.
 J. W. A. WRIGHT—Merced, Tulare and Kern counties
 J. R. C. HOAG—California.
 B. W. CROWELL—Los Angeles and San Bernardino counties.
 L. WALKER—Sacramento, San Joaquin and Stanislaus counties.
 N. H. HARRISON—Plumas county.
 A. C. KNOX—Santa Clara county.
 M. H. JOSEPH—Eureka, Nev.
 GEORGE McDOWELL—Sonoma and Mendocino counties

News in Brief.

THERE will be a narrow gauge railroad into the northern mining camps from Theson.

THE improving effect of the late rains is made manifest by the rapid growth of grain in the State.

FOUR more cadet officers were reduced to the ranks at Annapolis, Saturday, for recent acts of insubordination.

A POLE has been sentenced by a French court to two years' imprisonment for threatening to murder President Grevy.

OSCAR WILDE, it is said, will return to this country in the summer to superintend the production of a play which he has written.

THE Maine House, 104 to 37, ordered en masse the prohibitory amendment. An attempt to except cider failed by a vote of 56 to 80.

A CHICAGO inventor of a rope fire escape, who refused to give his name, tried his apparatus Saturday morning, and sustained fatal injuries.

THE Fire Commissioners, of Buffalo, have ordered all hotels to place balconies on each floor and connect them by single ladders, under penalty of fine.

TWO hundred or more gambling and policy shops in Boston closed their doors Wednesday week, in consequence of an order by the Police Commissioners.

THE theory that tramps set fire to the New-hall house, Milwaukee, is now advanced. It is said they frequently sneaked into the coal cellar for a night's lodging.

THE New Orleans *Picayune* asserts that the death rate has increased at Memphis since the completion of the sewer system, and seems to prove it by statistics.

A BILL has passed the Arkansas Legislature prohibiting for two years the sale of intoxicants within three miles of any church or school, on petition of a majority of adult inhabitants.

BARTHOLOMEW's statue of Liberty is nearly completed. It is to be a free gift from France to the United States, and as yet the subscription to the pedestal is not sufficient to pay for a corner stone.

San Francisco Metal Market.

[WHOLESALE]

[THURSDAY, Feb. 22, 1883.]

ANTIMONY.—		
Per pound.....	—	@ 15
IRON.—		
American, Pig, soft, ton.....	27	@ 31 00
Scotch, Pig, ton.....	00	@ 23 00
American White Pig, ton.....	—	@ 27 00
Oregon Pig, ton.....	—	@ 30 00
Copper, Gun, Nos. 1 to 4.....	—	@ 40 00
Refined Bar.....	4	@ 50 00
4 in. Sheet, keg.....	—	@ 5 50
Nail Rod.....	—	@ 7 00
Norway, according to thickness.....	6 1/2	@ 7 1/2
STEEL.—		
English Cast, lb.....	16	@ 25
6 in. Diamond, ordinary size.....	—	@ 14
Drill.....	15	@ 16
Machinery.....	12	@ 14
COPPER.—		
Ingot.....	—	@ 22
Sheet.....	37	@ 31
Spouting, Tinned 14x18.....	—	@ 31
Nails.....	—	@ 33
Boil.....	—	@ 8
Old.....	—	@ 8
Bar.....	—	@ 15 1/2
Cement, 100 fine.....	—	@ 15 1/2
LEAD.—		
Pig.....	4 1/2	@ 5 1/2
Sheet.....	—	@ 6
Pipe.....	—	@ 9
Sheet, discount 10% on 500 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 30
Unbleached.....	—	@ 2 50
TIN PLATES.—		
Charcoal.....	7 25	@ 7 50
Oake.....	6 25	@ 8 40
Bacon Tin.....	—	@ 25 10
Australian.....	—	@ 25 00
1 C. Charcoal Roofing 14x20.....	—	@ 6 90
ZINC.—		
By the Cask.....	—	@ 9
Zinc sheet 7x3 ft. 7 to 10 lb, less the cask.....	—	@ 10
NAILS.—		
Assorted Sizes.....	4 00	@ 4 75
QUICKSILVER.—		
By the flask.....	—	@ 37 1/2
Flasks, new.....	—	@ 1 25
Flasks, old.....	—	@ 1 05

Pacific Coast Weather for the Week.

(Furnished for publication in the Press by NELSON GOROM, Sergt. Signal Service Corps, U. S. A.)

The following is a summary of the rainfall for each day of the week ending 11:58 A.M. Wednesday, Feb. 21, for the stations named:

Date.	Portland.	Portland.	Roseburg.	Cape Mendocino.	Red Bluff.	Sacramento.	San Francisco.	Visalia.	Los Angeles.	San Diego.	Winnemucca.	Pioche.	Salt Lake.
Feb. 21.	1.23	.99	.16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 20.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 19.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 18.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 17.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 16.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 15.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 14.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 13.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 12.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 11.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 10.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 9.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 8.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 7.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 6.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 5.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 4.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 3.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 2.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Feb. 1.	.80	.80	.80	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

*Reports missing.

THE MEMBERS of the Ladies' Cooking Society, of San Francisco, held a most interesting and instructive meeting this week. The subject under discussion was the purity and relative value of the various baking powders now on the market competing for public favor. After an animated and extended interchange of views had taken place, samples of the various brands were produced and their purity put to the well known boiling test. A small quantity of each powder was placed in a little water and boiled for a few minutes. Those powders that were adulterated with starch or flour made a fair article of paste when put through this ordeal; those drugged with ammonia were detected by the odor of the paste when warm, while the New England, composed of cream of tartar and soda only, simply dissolved and, after settling, left the water perfectly clear. The New England Baking Powder passed all these tests and practical trials with entire satisfaction, and the whole assembly of ladies united in its praise.

Easy Binder.

Dewey's patent elastic binder, for periodicals, music and other printed sheets, is the bandiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Record, Home Journal, Harper's Weekly, and Scientific American, 75 cents; postage, 10 cents. Postpaid to subscribers of this paper, 50 cents. Send for illustrated circular. Agents wanted.

Type for Sale.

15 Cts. per lb.

About 1,000 lbs. of Scotch brevier type used on this paper previous to Jan. 13th, 1883, will be sold in lots of 100 lbs., or more, for 15 cents per lb., and cost of boxing and shipping, if applied for soon. Apply to Dewey & Co., Publishers, No. 252 Market St., S. F.

New Sheet Music.

Quite a variety of songs and pieces appears among the newest publications of Dison & Co., just received. First there is a quaintly pretty "go-pel song," by Bonar, "Is this all?" (30 cents), made into an accepta'ble sacred quartet by C. W. Green. Then we have "Voices" (30 cents), a melodious song by Birch; "Oh, You Little Darling" (30 cents), in popular style, by Tabran; "Laughing Old Farmer Mace" (35 cents), comic song by Newhall; "Invitation to the Waltz" (50 cents), for violin and piano, by Winner; "Lexey Glen Schottische" (30 cents), by S. M. Tod; "Album L'at" (30 cents), piano piece by Lange; another quite different "Album Leaf" (30 cents), by Seelman, and good plantation song, "When the Ole Man is laid away" (30 cents), by L'Orange.

Agents Now Wanted.

Extra inducements will be offered for a few active canvassers, who will give their whole attention (for a while at least) to our business. Apply soon, or address this office, giving address, age, experience and reference.

DEWEY & CO., Publishers.

No. 252 Market St., S. F.

A Cheerful Recommendation.

BENICIA, CAL., February 4, 1883.

Messrs Dewey & Co., Patent Solicitors:—I am in receipt of my patent, "Improvements in Vehicle Brakes," obtained through your Agency, and would say I am much pleased with thorough and graphic description in specifications and drawings, and can cheerfully recommend you to anyone wishing to obtain favors in your line.—Truly yours, G. R. DRYAL.

Books for Miners and Millmen.

KUSTEL'S CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for gold-bearing sulphurets, arseniurets, and gold and silver ores generally, with 120 lithographic diagrams. 1867. This work is unequalled by any other published embracing the subjects treated. Post-paid, \$7.50. Printed and sold by Dewey & Co., S. F.

KUSTEL'S ROASTING OF GOLD AND SILVER ORES (Second Edition, 1880), and the Extraction of their Respective Metals without Quicksilver. Illustrated. 156 pages. A valuable and carefully written work. Postpaid, \$3. Sold by Dewey & Co., S. F.

AARON'S LEACHING GOLD AND SILVER ORES.—The most complete hand-book on the subject extant, 164 pages octavo. Illustrated by 12 lithographic engravings and four woodcuts. Fully indexed. Plainly written for practical men. In cloth, \$3. Sold by Dewey & Co., S. F.

PHILLIPS' EXPLORERS' AND ASSAYERS' COMPANION (Third Edition). Price of Vol. 1, post-paid, 56 Sold by Dewey & Co., S. F.

COPP'S AMERICAN MINING CODE, to replace Copp's Handbook of Mining Laws, now out of print. United States, State and Territorial Mining Laws and Land Office Regulations; Digest of Land Office and Court Decisions; List of Patents Issued, and Dr. Raymond's Glossary with Form for Mechanics' Liens, Location Notices, etc. Price, postpaid, in paper, 50 cts. Sold by Dewey & Co., S. F.

THE EXPLORERS' MINERS' AND METALLURGISTS' COMPANION, by J. S. Phillips, M. E., comprising a practical exposition of the Various Departments of Exploration, Mining, Engineering, Assaying, and Metallurgy, containing 672 Pages and 83 Engravings. Price, bound in cloth, \$10.50. Sold by Dewey & Co., S. F.

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MINING, ENGINEERING, MECHANICAL, FARMING, SCIENTIFIC, INDUSTRIAL AND NEW BOOKS in general can be ordered through Dewey & Co., publishers of the MINING AND SCIENTIFIC PRESS, S. F., at publishers' rates.

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"Abel Stearns RANCHOS."

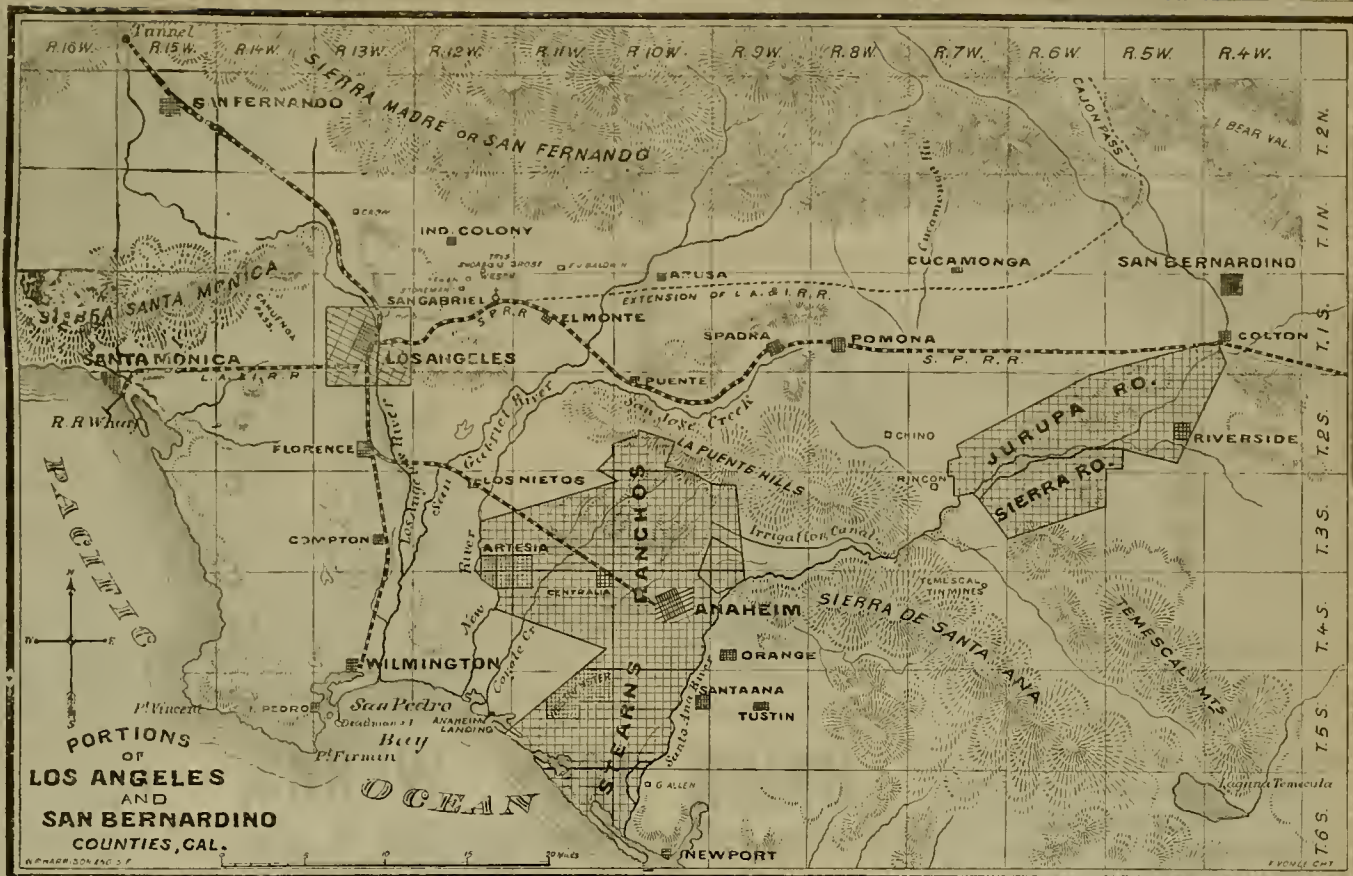
The Center of Los Angeles Valley.

Embracing Anaheim, Westminster, Artesia, Garden City, etc. Thirteen miles southeast of Los Angeles City, within the Artesian Well Belt. Hundreds of flowing pipe wells. Water near the surface. Rivers on two sides; ever-flowing creek runs through the tract. Front on the Ocean. Transportation and passage by Steamships or Railroad. Southern Pacific Railroad through the tract. Twenty-one hours from San Francisco. The new land for sale or lease in sections or fractions. Apply to Trustee A. ROBINSON, 318 California St., San Francisco.

Or to ROBERT J. NORTHAM, Anaheim, Cal., or concerning Westminster Colony, to REV. ROBERT STRONG, Westminster, Cal.

Terms, one-fifth cash, balance on interest at 10 per cent. per annum.

Send for Circular and Map.



Redlands.

Good water, rich soil and magnificent view. High elevation, dry air, few fogs and northerers.

No brush or fence on the land, which is especially adapted to the culture of the orange and raisin grape.

Near to church, school, store and depot. Hotel open. Telephone Communication.

Stage from San Bernardino Tuesdays, Thursdays and Saturdays.

The price of land has steadily advanced from the first price of \$50 per acre until now it is held at \$200 per acre.

SEND FOR CIRCULAR.

JUDSON & BROWN,

Redlands,

SAN BERNARDINO, CALIFORNIA.

JOHN BERGSTROM, ORGAN BUILDER.

9th. and Mission Sts.

QUICKSILVER.

THE CELEBRATED A BRAND.

Shipped Direct from the New Almaden Mine, New Almaden, Santa Clara Co., Cal.

For sale in any quantity. Trademark A on top of Flasks secured by United States Patent, and registered. Flasks contain 76 1/2 lbs. Quicksilver. Weight and purity guaranteed.

CARLOAD LOTS will be shipped from San Jose, Cal., for Nevada, Arizona, New Mexico, Montana and Idaho or Utah, or delivered at Pacific Mail Steamship Co.'s wharf, and Depot of S. P. R. Co., San Francisco, without charge. Railroad rates from San Jose are the same as from San Francisco.

J. B. RANDOL,

P. O. Box, 1078. 320 Sansome Street, S. F.



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Silver Plated

AMALGAMATING PLATES, For Saving Gold.

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SEND FOR PRICE LIST.

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Good Land and Sure Crops.

There has been steady and tolerably rapid advancement made in the growth of a majority of the towns in Colusa, Butte, Tehama and Shasta counties. Especially is this so in the agricultural districts where the land produces at least fair crops in all seasons—wet or dry—as does the land on the Reading Ranch. Those looking for homes in California where diversified farming will pay every year; where wood and water are plenty and easy to be obtained, and other desirable advantages are to be had, should address the proprietor of the Reading Grant.

Some 14,000 out of 26,000 acres of the grant remain in sale at comparatively low rates, in quantities to suit purchasers, on easy terms. Prices range from \$5 to \$30 per acre. The tract is between two and three miles wide, with the Northern Division of the C. P. R. R. passing centrally through its entire length. Send postage stamp for free circulars containing information about Shasta County and these lands, to the proprietor of Reading Ranch. EDWARD FRISBIE, Anderson, Shasta County, Cal.

The Lemmon Herbarium

This Herbarium has been removed from the Blake House to a permanent place at 1205 Franklin St., near Fourteenth St., Oakland, one square east of the Post Office, where plants of the Pacific Coast, including Arizona, may be determined on application, and instruction given in botany during the winter. Sets or single specimens of the rare and new ferns of the Pacific Coast for sale.

CHAS. E. LLOYD, J. S. BEARDSLEY, BEARDSLEY & LLOYD, REAL ESTATE AGENTS.

No. 912 Broadway Street, Between 8th & 9th Sts., Oakland.

Particular Attention given to Negotiating Loans upon Favorable Terms. Acting as Agents for Buyers and Sellers of Real Estate, and the Management of Business for Absent Owners.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill & Mining Company.

San Francisco, February 10, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 69, of fifty cents (50c.) per share, was declared, payable on Thursday, February 15, 1883. Transfer books closed on Monday, February 12, 1883, at 3 o'clock P. M.

WM. WILLIS, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

REMOVAL.

THE BERRY & PLACE MACHINE CO.

Have Removed from 323 and 325 Market Street, to

NO. 8 CALIFORNIA ST.



Goods and by the "GARLAND" IMPROVED SEWER GAS TRAP MFG CO., 1901 Broadway, Oakland, Cal. Coast Rights for sale.

PATENTS

BOUGHT AND SOLD FOR INVENTORS AND HANDLED IN UNITED STATES AND EUROPE. Profitable Investments in Valuable Patents made for Capitalists by

GEORGE B. DAVIS,

320 CALIFORNIA STREET, Room 14, (Over Wells, Fargo & Co.'s Bank)

SAN FRANCISCO, CAL.

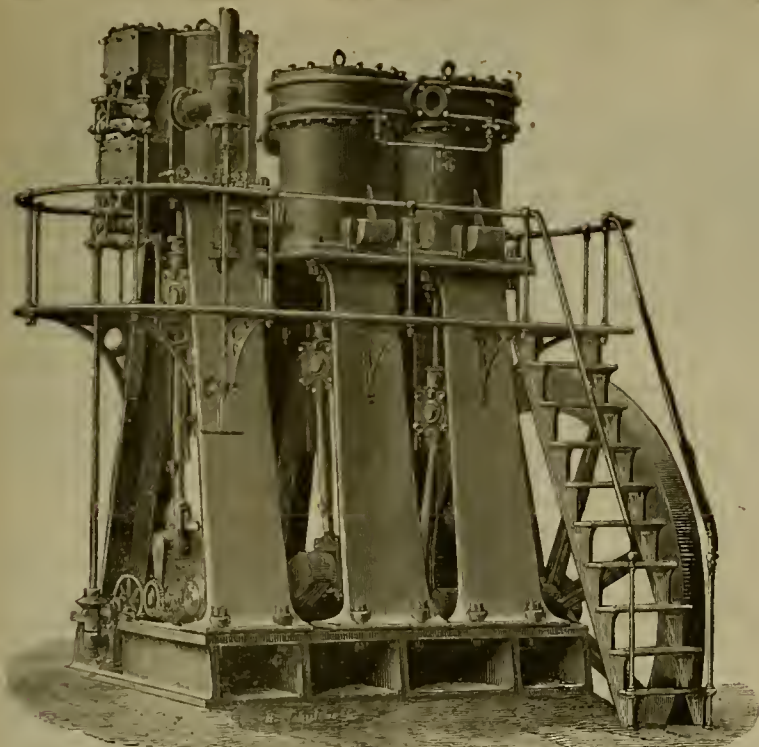
The Pacific Coast offers a good market for useful inventions. This office offers convenient and central quarters where inventors can exhibit and explain their models free of charge. Reliable Agents in Eastern States. Circulars sent free.

BOONE & MILLER, Attorneys & Counsellors-at-Law,

Rooms 7, 8 and 9. No. 320 California Street, S. F., (Over Wells Fargo & Co.'s Bank.)

Special Attention Paid to Patent Law.

N. B.—Mr. J. L. Boone, of the above firm, has been connected with the patent business for over 15 years, and devotes himself almost exclusively to patent litigation and kindred branches.



With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

Mining Machinery Depot,

PARKE & LACY,

21 and 23 Fremont Street. S. F.

NO. 7 IMPROVED

AIR COMPRESSOR.

SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

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IRON AND STEEL WIRE HOISTING ROPES.

ORE

CARS.



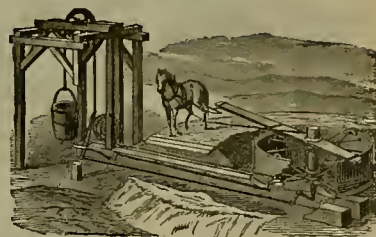
HORIZONTAL AND VERTICAL ENGINES
1 to 100 Horse Power.

ORE AND

Water Buckets.

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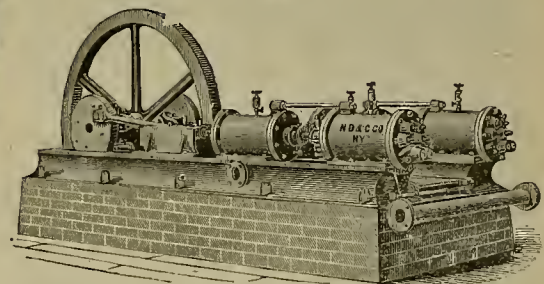
Compressors.



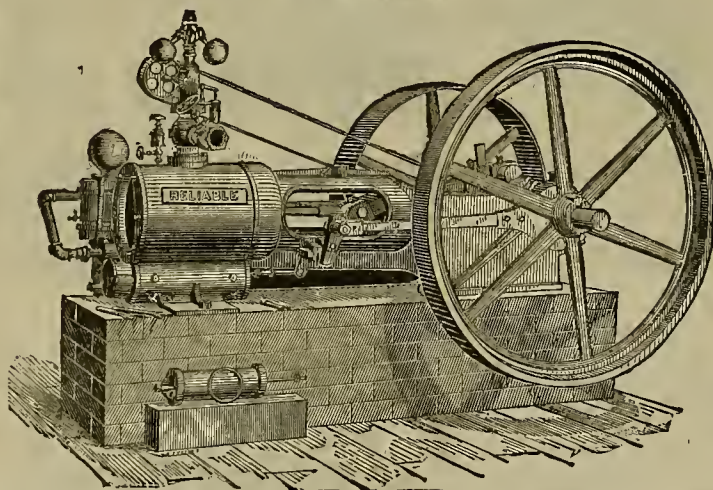
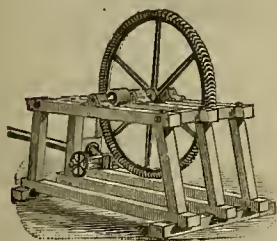
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One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The whim is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of the whim is bolted to bed-timbers, thus avoiding all frame work. When required these whims are made in sections to pack on mules.

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KNIGHT'S
Mining Water Wheel.
OVER 200 IN USE IN CAL.



PACIFIC MACHINERY DEPOT.

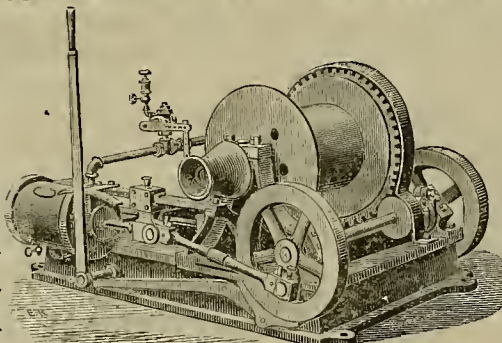
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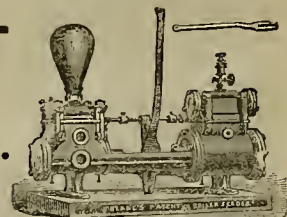
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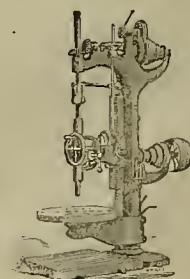
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BLAKE STEAM PUMP.
More Than 16,000 in Use.



The Korting's Injector is the simplest, cheapest and best in use. Will draft its own water, hot or cold, and feed under varying pressure. Send for Circular.



COPPER.

SOME FACTS REGARDING THE YIELD IN 1882.

The Rankin & Brayton Pacific Copper Smelters—A Cheap and Effective Furnace for Reducing Copper Ores.

The copper mining interests of the country at large are of vast importance, statistics at hand showing an enormous increase in the yield of this useful metal during the past year. The yield of the Lake Superior mines during eleven months in 1882 was as follows: The Calumet & Hecla paid, in dividend, the sum of \$2,000,000; the Quincy, \$820,000; the Central, \$50,000; the Atlantic, \$50,000; the Osceola, \$250,000. The aggregate yield of these five mines for the eleven months ending November 31, 1882, was 21,400 tons of ingot copper, or a total in coin of \$2,900,000. The total dividends paid by these mines up to the date mentioned reached the sum of \$28,140,000.

This, however, is but a small proportion of the yield of copper during that period. Throughout the western States and Territories the exploitation and development of copper mines is steadily progressing, and we predict for the current year a yield that will greatly exceed—if it does not quite double—this amount.

In New Mexico the discovery of extensive veins of copper, in the Fra Cristobal and Caballo mountain districts, has given a fresh impetus to this important branch of the mining industry in that Territory.

In Montana, copper is found in paying quantities in nearly every portion of the Territory. Her yield, last year, was 10,000,000 pounds.

The product of Michigan, alone, was, in 1882, 51,500,000 pounds.

Arizona, where the copper interest is yet in its infancy, gave an output last year of 15,500,000 pounds.

Doubts have been expressed by mining men as to the reward which might await those who should undertake the development of the vast deposits of this mineral that are to be found so abundantly distributed throughout the West.

Owners of such properties need have no misgivings as to a profitable market for copper. The home consumption alone, last year, was 45,000 tons—but 140,000 pounds less than the entire product of the country.

The improvements in electrical appliances, and the many new uses for copper in the mechanic arts, will insure a profitable market for all that

our mines—old, new and yet to be discovered—may produce. One of the great electric lighting companies consumed, in 1882, 6,000,000 pounds. The exports during that period, in ingot copper, pyrites, mattes and miscellaneous copper products, is roughly estimated at 6,000,000 pounds. The demand for this metal, it may safely be said, is now in excess of the supply.

In the development of this important industry the use of machinery exactly adapted to the process of reducing the ore to a marketable condition is a highly important factor. In this the

Pacific Copper Smelter,

Manufactured by Rankin & Brayton, proprietors of the Pacific Iron Works of this city, is proved to be the best and most economical apparatus yet discovered. Indeed, the invention of the Pacific Water Jacket Smelter, made and manufactured only by the above-named firm, has entirely revolutionized the business of smelting, and made practicable the working of copper ores in all their various combinations.

This smelter is simple in construction; perfect in its operation. Its very low cost commends it to the consideration of all mining men, but more particularly those of limited means.

It Can be Run Continuously,

Without loss of time and without expense for repairs. It unfailingly gives the highest product at the smallest possible expense for fuel and attendance.

It is a fact, established beyond dispute, that no other smelting apparatus can compare with the Rankin & Brayton

Water Jacket Furnace

For practical and satisfactory results. Where all other smelting processes fail, the Pacific Copper Smelter proves equal to all that is required of it.

The whole structure is complete as it leaves the works, ready to set up, requiring no brick work, except a few courses for forming the crucible, and can, therefore, be put up ready for operation at small cost, and in a few days' time. The Jacket is made of heavy flange iron of the most enduring quality, and with much more care than is ordinarily given to any class of boiler-work.

Patent Circulating Plates

Are formed in the water space to insure a rapid circulation of the water. This device, by leaving no spot within the water space where the water is not in constant and rapid motion, causes the heat to be evenly distributed throughout the whole jacket, and thus prevents unequal expansion and contraction, and consequently leaky joints. The motion of the water also prevents any scale or sediment from depositing on the surface, and in this respect is of great advantage where water used is highly mineralized.

A High Degree of Economy

In the use of water is also attained by this device, as all the water introduced into the jacket is brought in contact with the heated surfaces, and

none escapes the over-flow without having absorbed all the heat possible. In many localities where water is scarce, this point is one of much importance. Experience has shown this to be the most valuable improvement ever made in Water Jacket Smelters, adding at least two or three times to the effective wear and service of the jacket, besides saving in loss of time and cost of repair.

The Arrangement of Tuyeres

Is such as to secure a perfect delivery of blast to every part of the charge, producing a uniform melting area throughout its entire section, thus obtaining rapid action of the furnace, great economy of fuel, and preventing any tendency to freezing. The tuyeres, being entirely within the water space of the jacket, are wholly protected from the action of heat, and consequently never burn out or become a source of trouble. Peer-holes, with removable cap and mica covering, are arranged opposite each one, so the processes going on inside the furnace can be constantly observed.

These furnaces invariably overrun their rated capacity. In many instances this is remarkable—a 20-ton smelter frequently running 30 to 35 tons in 24 hours. With most other machines for this purpose the reverse is too often the case. In no single instance has one of these smelters failed to give entire satisfaction; with sometimes results surprising to manufacturer and patron, alike—this fact being due largely to the perfect distribution of and application of the blast.

The Crucible

Is formed on a bottom, hinged to a plate that can be instantly dropped when any obstruction occurs, or for access to the interior when repairs are necessary.

The economy and facility with which these furnaces are operated makes it possible to profitably reduce ore of a much lower grade than has heretofore been thought practicable; and consequently the field for such enterprises has been greatly enlarged.

The great success of this smelter has induced various dishonest persons to imitate it. But the limitation does not extend beyond the general external appearance of the structure. Its many uniform advantages are peculiar to itself, and cannot be found in any counterfeit presentation of the original. The most valuable features are

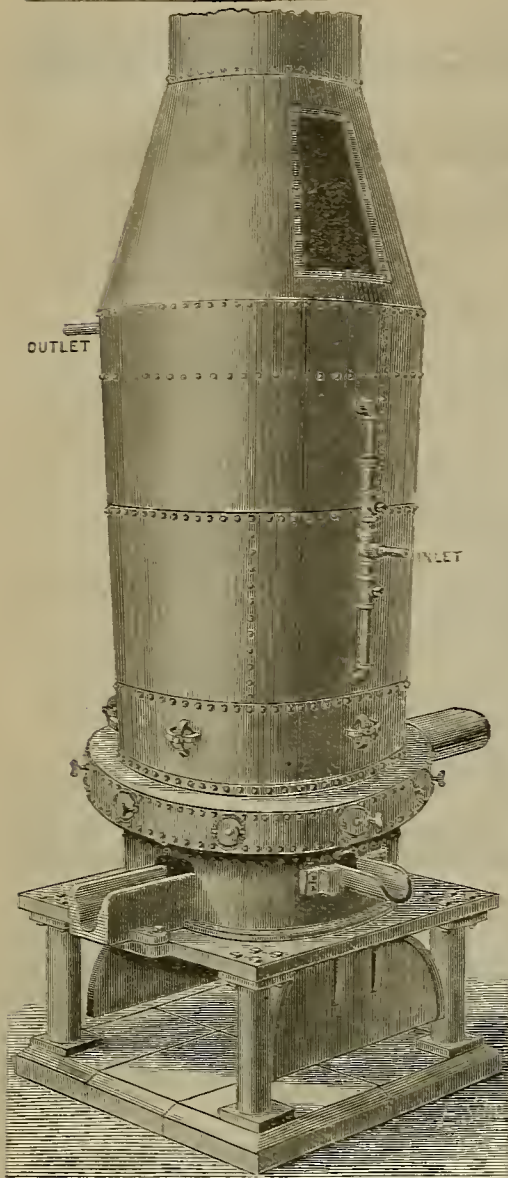
Covered by Letters Patent.

No furnace similar to it can be made without infringing upon that manufactured exclusively by or under control of Rankin & Brayton.

These smelters are made of ten, twenty and thirty tons daily capacity. The larger size is recommended as the most desirable, when the ore development will warrant it, for the reason that the expense of running it is but little more than that of the smaller sizes.

The importance of this invention can not be over-estimated. It will prove a most important factor in the development of the rich veins of copper that are constantly being discovered in all parts of the country.

Mr. Brayton returned, a few days since, from an extended trip through the Eastern States. He comes back to us fully impressed with the growing importance of the copper production of the country, and while the construction of the varied machinery for the reduction of gold and silver will not be permitted to flag, special attention will be paid to the manufacture of the Pacific Copper Smelter and other appliances for working the products of copper mines.—S. F. Stock Exchange.



REDLANDS.

Good water, rich soil and magnificent view. High elevation, dry air, few fogs and northerly. No brush or fences on the land, which is especially adapted to the culture of the orange and raisin grape.

Near to church, school, store and depot. Hotel open. Telephone communication. Stage from San Bernardino Tuesdays, Thursdays and Saturdays.

The following information concerning one of the best-reputed and promising colony enterprises in Southern California, is from the Riverside Press, of San Bernardino County, April 1, 1882.

A Model Settlement.

"No place in California has sprung into public notice so rapidly and gained so deserved a reputation in so short a time as has the new tract of Redlands.

This tract is located between Old San Bernardino and Crafton, on the south side of Mill Creek ditch, and comprises 2,500 acres of as choice fruit lands as can be found in the State. The land is of a reddish clayey loam, not clayey enough to work hard, having sufficient admixture of sand to hold moisture and give the best results when planted to orchard or vineyard. The red lands of the State are everywhere celebrated as being superior for tree and vine.

The tract slopes to the northwest, and commands one of the grandest views to be found in the State. The track of the Southern Pacific railroad runs one and a half miles from the center of the Redlands tract, and a depot has been established for the accommodation of Redlands and neighboring settlements.

The Redlands tract is laid off by running avenues from northeast to southwest, one-quarter of a mile apart and cross streets at right angles to these avenues every half mile, thus cutting the tract into blocks, each of which contains 80 acres. The avenues are each 100 ft. wide. The cross streets are 60 ft. wide.

Town Plat

Near the center of the tract is a town plat, consisting of 140 acres, cut up into lots ranging from an ordinary business lot to two and a half and five-acre residence lots.

The Water System

Is one of the most perfect in the State. The water supply comes partially from the South Fork ditch of the Santa Ana river and partially from private water developments in the Santa Ana canyon and other localities. The waters are to be conducted to a large reservoir, located in a canyon adjoining the tract, and distributed from this reservoir by means of cement pipes. These pipes are so laid as to carry the water without loss to the highest point on each ten-acre lot. The basis of water supply is one inch of water, statute measurement, to each eight acres of land. This is ample, and up to the best irrigated tract in the State.

The orange, lemon, apricot, peach and raisin grape will grow here to perfection. Judson & Brown, San Bernardino P. O., owners of the tract, are energetic men, who leave no stone unturned to make their enterprise a success. They do not try to figure how little they can do and sell their land, but where they can put another thousand dollars and make the tract more desirable to first-class settlers. There is nothing shoddy about their operations. Redlands will stand in a few years as one of the finest settlements on the Pacific coast.

SEND FOR CIRCULAR.

JUDSON & BROWN,

Redlands,

SAN BERNARDINO, CALIFORNIA.

EMERY WHEELS and GRINDING MACHINES.

The Tanite Company.

STROUDSBURG, MONROE COUNTY, PA.



Orders may be addressed to us at any of the following places, at each of which we carry a stock.

SAN FRANCISCO, CAL.

No. 2 and 4 California Street.

PORTLAND, OREGON,

No. 43 Front Street.

CHICAGO, ILLINOIS,

No. 152 and 154 Lake Street.
And 40 Franklin Street.

ST. LOUIS, MISSOURI,

No. 909 North Third Street.

ST. LOUIS, MISSOURI,

No. 511 to 519 North Second Street.

GIANT POWDER.

MANUFACTURED UNDER ALFRED NOBEL'S ORIGINAL AND ONLY VALID PATENT FOR NITRO-GLYCERINE POWDERS.

All Nitro-Glycerine Compounds, for instance, so-called HERCULES, VULCAN, VIGORIT, NITRO-SAFETY Powder, Etc., are infringements on the Giant Powder Co.'s Patents.

THE GIANT POWDER COMPANY

Call Special Attention to their Improved Grades of Powder.

- No. 1.—The most Powerful Explosive Compound now in use.
- No. 2.—Surpasses in strength any Powder of its class ever manufactured.
- No. 3.—This grade is a Strong and Reliable Powder, which does excellent work.

JUDSON POWDER

Is now used in all large Hydraulic Claims, and on most Railroads. It breaks much more ground, and obviates reblasting by breaking much finer. TRIPLE FORCE CAPS AND ALL GRADES OF FUSE.

The Giant Powder Company have also purchased from Mr. Nobel, the inventor of Nitro-Glycerine, his latest invention, known under the name of

NOBEL'S EXPLOSIVE GELATINE

This explosive is from 50% to 80% stronger than the strongest Nitro-Glycerine Compound and impervious to water. Even hot water does not diminish its strength. We are now introducing the same.

BANDMANN, NIELSEN & CO., General Agents, 210 Front St., S. F.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MARCH 3, 1883.

VOLUME XLVI
Number 9.

Placing Frue Concentrators.

The use of a revolving belt, either plain or with riffles or buckets, as a carrier for various materials is not of recent date, but the application of a lateral shaking motion to such a belt—a motion closely resembling that given to a shovel in ranning by hand—is a novelty, and constitutes the essential element of the success of the Frue concentrator. A revolving belt of canvas with a lateral or end blow has been used in Germany and England, and also in the States, and though pretty good results were obtained with it, the difficulty of making the belts last proved too great. The *side shake* is as great an improvement over the *blow* as the perfect rubber belt, with permanent high flanges, is superior to the rough, costly, short-lived canvas belt. The Frue concentrator, as now made, though so simple in its appearance and action, is the result of no small expenditure of thought and time, and has been evolved only after a process of variation and selection extending over a number of years.

Several hundred of these machines are now running in the mining regions on this coast, and doing good work. Perhaps the best recommendation that could be given for them lies in the fact that, in many places where they have been in use for some time, more of the same pattern have been ordered.

So well known are the machines that no description of this concentrator or operation is necessary, and the engraving in our advertising columns will show the appearance of the machine to those who have not seen it. There is sometimes some doubt as to the best place to put the concentrator, but the accompanying engraving will indicate this. The cut shows the position of the Frue concentrator (placed with its foot towards the battery), in a gold mill, where only one is used for five stamps; where two are used, the head of the second one is placed towards the head of the one shown.

The counter shaft to drive the Frue concentrators is placed parallel with the cam shaft and main line shaft of the mill. It is therefore placed at right angles to the crank shaft and pulley of the concentrator itself. This necessitates the use of a quarter-twist belt. The proper placing of this counter shaft and pulley is very important; for with it properly set the quarter-twist belt runs as well, as true and with as little wear as if it were a straight belt; while if not properly set it will run off the pulley. This placing of counter shaft and pulley for quarter-twist belt does not seem to be generally understood even by good mechanics, and we, therefore, give the above cut, illustrating the placing of this counter shaft; this will make plain the proper method; *a a* is the crank shaft of the concentrator; *b b* is the counter shaft; on *b b* are one tight and one loose pulley—the belt is shown on the tight pulley.

The rule is as follows:

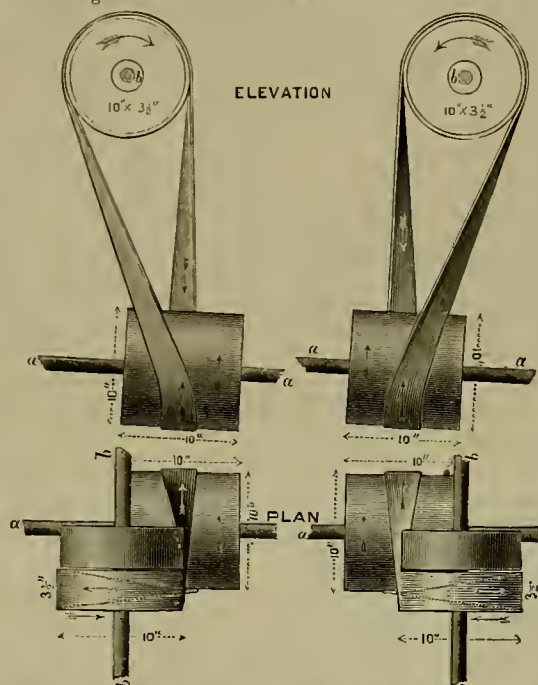
"In placing the counter shaft and its pulley, the pulley should be set so that the side from which the belt leaves it is in line with the

square of the crank shaft of the concentrator at that point."

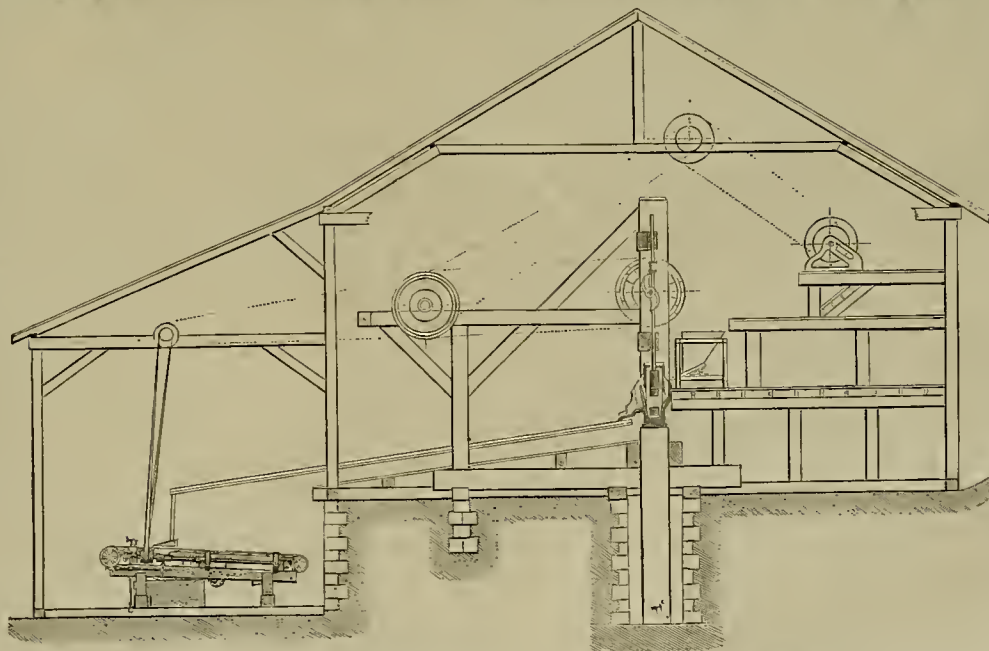
It will be borne in mind that the crank shaft is not horizontal. This engraving will serve as a guide to mechanics who want to use a quarter-twist belt with any mechanism.

THE Salt Lake Tribune gives a statement of

AN OLD MINER'S FATE.—On Wednesday the 14th inst., Robert Hammon, an old miner, about 56 years of age whose past history none of his neighbors knew anything of, was found dead in his claim near Marble Valley, where he was engaged in the old-time employment of panning



ARRANGEMENT OF SHAFTS AND PULLEYS FOR QUARTER-TWIST BELT.



PROPER POSITION OF FRUE CONCENTRATOR WITH RELATION TO BATTERY IN GOLD MILL.

the expenditures made in Utah Territory in 1882 by the various mines. The Horn Silver mine leads the list by a total expenditure of \$1,333,800. The Ontario follows with \$978,000. Six other claims have expended from \$200,000 to \$772,000. Eight more have disbursed from \$100,000 to \$181,300, and about 20 more have spent from \$10,000 to \$75,000. The list contains 35 claims or firms, and the total amount expended in 1882 is \$6,432,100.

out some old ground. Coroner Spencer held his first inquest on the miner's body on Thursday the 15th, and the jury returned a verdict of death from natural causes. A search revealed that the pitiful sum of \$3.85 represented all that remained of the old Argonaut's earnings. And such fortune, such death and such burial, is not an infrequent outcome of the hopes and day-dreams of many California pioneers.—*Mountain Democrat*.

Working Blue and White Cement.

It is a mistake to suppose that all the material which is washed from the gravel mines of this State is of the same character. It is incorrect to assume that the character of the material now being worked in some of the well developed hydraulic mines is the same as it was when the mines were first being opened, and the top strata being removed; when the material was light and easily washed, requiring little or no powder in its disintegration; when the sluices were yet upon heavy grades, and every facility exerted for washing away immense quantities of material. Now, in some of the big mines, properly opened, operations are confined more or less to the bottom stratum, where the gravel is firmly cemented; where immense boulders are constantly met with; where the gravel itself must be blasted again and again before it can be washed into the flume; where in many instances it is carried to the dump a distance of 3,000 or 4,000 feet, practically without disintegration, and where the grade of the flumes have been reduced, of necessity, to a minimum, in order that any outlet at all may be obtained. The great difficulty of working mines of this character is well illustrated by the fact that the Excelsior mine, at Smartsville, although it has a perennial supply of water, can use it, in washing gravel, only 120 days in the year; two thirds of the time being devoted to breaking up lumps of cement and boulders.

A brief description of the character of ground worked by those mines now working the bottom channel or "blue lead" will be of interest. Taking the Excelsior mine, at Smart-

ville, as an illustration, the subjoined is a description by an intelligent and truthful miner of the condition and character of the bank upon which it was operating, when enjoined at the suit of the County of Yuba:

"The gravel and other material in the Smartsville claim is exceeding solid and compact. The bank varies in height from 150 to 200 feet, but will not average more than 175 feet. Of this bank, the first 60 feet above the bed-rock is composed of large boulders (some of which areas much as 20 feet in diameter, and weigh as much as 300 to 400 tons), and of large cobble-stones, weighing from 50 pounds downwards, and of finer gravel, all firmly cemented together by what is known among miners as the "blue cement." Above this is the "white cement," which extends to the surface of the claim, and is composed of a mass of boulders and gravel, firmly cemented together, and which is very hard and compact, and is impervious to the action of water. Drifts cannot be run in in any part of the gravel in said mine without using powder. In running powder drifts in the bank, it sometimes takes three "eight-hour shifts" of miners, working constantly night and day, a week to run 10 feet. When blasted this white cement comes down in immense masses, tons in weight, and it is necessary to blast it over and over again before it is reduced to a size which renders it practicable to wash it through the flume. The large boulders above spoken of, which are found in the lower stratum, are blasted and broken into fragments weighing from 150 pounds to 250 pounds, before they can be washed into and through the flume,

Wyoming Mines.

Miners' Delight District.

A correspondent of the Salt Lake Tribune, writing from Atlantic City, Wyoming, says:

The attention of Colorado capitalists is being called to a section of mining country situated in Miners' Delight mining district, which, for want of time, I failed to mention in my former letter in your paper. A mere mention would fail to give the section above referred to justice, as there is one mine alone which deserves more than passing notice.

For several years past a couple of placer miners, Lovell and Harding, have been working in Strawberry gulch (just where the overland stage road crosses the same, and within a few yards of the old station), with very fair success, having taken out from \$8 to \$20 per day to the hand. Such work could only be done when the spring snows melting, afforded them water. A year ago last summer they washed upon a ledge crossing Strawberry gulch in an east and west direction, and the decomposed rock (barren, as they thought) looked so favorable, they concluded to pan some of the same, which they did with favorable results. They immediately located a quartz vein, calling the same the Bullion. The locators were Harding, Lovell and Nickerson Bros., who immediately commenced sinking a shaft, and the first ten tons of ore taken from the shaft were taken therefrom before the parties had sunk eight feet, and hauled in loose wagon boxes to Miners' Delight mill, a distance of 11 miles. After hauling five times before the ore reached the stamps, it yielded \$505 or \$50.50 per ton. John Hartly, an old Sweetwater prospector, owned a claim adjoining, and fears were entertained that litigation might ensue, when a consolidation was effected whereby Hartly got one-fifth in the Bullion. He sold within a very few days for \$500 to Kuhn, of Ogden, and Newman of Miners' Delight. Harding and Nickerson, Sr., sold last fall fifth each to one Lewis of Denver, for \$1,000 each. Lovell sold last week his fifth to Lewis for \$5,000, the owners at present being Kuhn, Newman, Nickerson, Jr., and Lewis. Lewis erected a 10-stamp mill on the ground, and dropped the stamps about Dec. 20th, having contracted with his co-owners for the delivery of 7,000 tons of ore at the mill, which is situated on the ledge and within a few feet of the discovery. Water in sufficient quantity to run the mill (a steam mill, 40-horse power engine) not being easily obtained, only five stamps have been running, and they only a few hours at a time. The first clean up resulted in \$16 per ton, the second in \$22 and the third in \$29. While water is found within less than five feet of the surface on the ledge, still the same cannot, as yet, be procured in desirable quantities for running the mill steadily. A well has been sunk at the mill 42 feet in depth, which has served to keep the mine dry (the deepest shaft sunk on the ledge being 27 feet). The extreme cold snap of the past month has prevented work being pushed as rapidly as it otherwise would be pushed by the able manager, Mr. Lewis.

Your correspondent visited the mine in November last, and was surprised to see such vast quantities of ore. To say that it is a big thing would not be saying half; it is immense. Prospecting has been done in dozens of places on the claim, and everywhere the ore is uniform in value with that at discovery. It has been stripped on the surface for 100 ft. in width on the ledge with like results. I have seen several pans of dirt taken from the ledge and washed without any pulverizing of the rock; and have seen from \$1.50 to \$7 to the pan, and I have been told that one pan yielded \$25. What must be the feelings of the gold hunters of early days, when they hear of the rich strike on the Strawberry? Many will say, "Why, I passed right over that ground," and ten chances to one, half of them will swear they knew it was there all the time. Yes, you passed right over it within less than a foot of the surface. It has lain for centuries and within 100 ft. of the old Strawberry stage station, where a company of soldiers were for a long time stationed.

The First West Extension of the Bullion is owned by Flike & Miller, and the Second (Midias) and the Third (Dahlonga), extensions west are owned by four Salt Lake parties. The character of the ore is the same as that found in the Bullion, but there has been no development of either of the three properties last mentioned, as they were located at the beginning of the cold weather in November last, and the parties locating had no time to prepare for winter. Prospecting on Strawberry in winter time, means something more comfortable than a linen duster and a wickup.

The First Extension east of the Bullion is owned by the Charles Brother & Co. (Greatrix); the names of these claims I failed to procure. In each of these claims work is being pushed as rapidly as possible, and with the most flattering results. Charles Brothers have an immense body of gold ore, being the exact counterpart of that found in the Bullion. Greatrix has gold in his claim, and, as he says, "nary a wall."

After leaving the two last claims mentioned, and following in an easterly direction what one would guess to be the line of the ledge, and distant from the Bullion about two miles, we come to a claim owned by D. D. Wolf, a close student of Blackstone and a miner of Atlantic. The ore in this claim appears to be different from that found in any of the above mentioned claims, being black slate and iron, and from assays shows from \$90 to \$160 gold per ton. Having a five-foot vein, as Wolf has, if the assays are correct, he has a bigger thing than all

the knowledge he can glean from Blackstone during his natural life will ever yield him.

Adjoining Wolf's claim, which is on what is known as Deep Creek, is the Comet, owned by Salt Lake parties who propose opening up their claims in the spring.

Between the claim owned by Charles Bros. and Deep Creek no indication of mineral is found near the surface. The supposition is, the ledge runs deeper the further we follow it east. This is partly proven when we take a peep into Charles' shaft, as we find he had to sink 20 ft. before he caught the Bullion ledge, while the Bullion owners did not have to sink that many inches.

I know of nothing wanting to make this, in the near future, one of the most prosperous mining camps anywhere in the West, except it be a lack of industry—the kind of industry that should characterize mining men wherever found. There are here, within a radius of 12 miles, seven mills, some steam, some water, with from five to 20 stamps, the owners of which would work ore, or possibly sell. An abundance of timber grows down on us from the base of the Wind River mountains, with splendid roads to haul the same. There is an abundance of water in Rock creek, Willow creek and Sweetwater for running water mills. Hundreds of claims are lying idle, and many others which are being worked could be purchased at reasonable prices.

A town is springing up on Strawberry, and is named Lewiston, in honor of Mr. Lewis, the promoter of the mining enterprise that bids fair to equal any yet seen in the West.

Already we hear inquiries made by Colorado capitalists about the Sweetwater country, and I prophesy that, with the breaking up of winter, will come a rush such as was known here in early days. Let Utah not stand back, but come and see; seeing is convincing.

The Fauna of Arizona.

The fauna of Arizona is imperfectly understood even by our best informed citizens. This is doubtless owing to the immense area of our Territory, and the diversity of climate caused by the varying altitude of the different mountain ranges. The kings of our beasts are the grizzly and brown bear. Fortunately there are but few of these ferocious animals in the Territory. An occasional grizzly may be found in the highest mountain ranges in the northern part of the Territory; but the large brown bear, which in Arizona is about as large as a grizzly, may be found any where in the mountain ranges which reach an elevation of 7,000 feet and upward.

The brown bear of Arizona closely resembles the grizzly; his head is fully as broad as long, but his nose is more pointed, his hair is from four to five inches long, which hangs in tangled knots. During the first month or two after they come out in the spring, they are very ferocious, and if the hunter surprises him or gets in too close proximity he is almost sure to become the attacking party. We know of a number of instances in which prospectors and hunters have been attacked by the brown bear, some of which run very narrow escapes. We ourselves have had an experience with the brown bear which we would not care to repeat.

There are a few cinnamon bear in the northern part of the Territory, but they are seldom found in any of the southern mountain ranges. The little black bear inhabits most of the highest ranges of mountains. Last year they were plentiful in the Santa Catalinas. They are a beautiful little animal, with a coat of fine jet black hair, and are much smaller than the black bear of the north and Western States.

Next to the bear in the cat kind is the mountain lion, which are similar to those found in Colorado and California. They are a very wary but cowardly animal, and will not fight unless they are surprised or pressed. They abound in every part of the Territory and sometimes destroy calves and colts, but are more fond of sheep, of which they eat ravenously. They are the sheep herders' greatest enemy; two adult lions with their young have been known to kill as many as 50 sheep in a single night. Fortunately they are easily poisoned, and they seldom have more than one or two feasts of fresh mutton before they get a dose of strychnine.

The leopard is found on the western slope of the Baboquivaries and the low ranges of mountains to the west, near the Mexican line. He is a more compact built animal than the lion, and full as heavy. The Papago and Yaqui Indians say he is much more to be feared than the lion. He is beautifully marked, and his skin commands a high price, both here and in Sonora, being in demand among the Mexican vaqueros for leggings and saddle trimmings.

The gray wolf inhabits the mountain country, though they are very scarce.

The coyote is found everywhere. He is larger than those east of the Rocky mountains or in northern latitudes.

There are a very few panthers and a few lynx, but wildcats are found everywhere. There are a few wolverines in the northern part of the Territory, but none, so far as we know, have been seen in the south.

Arizona is greatly favored with deer, both of the black and white tail varieties, but their habits are exactly the reverse of the Rocky and Sierra Nevada mountains; there the black tails seek a habitation near the snow line, while the white tails are content to remain in the valleys; here the white tail deer are nearly always found in the higher mountains, while the black tails frequent the foothills and the valleys. The mule deer, which is the largest of the deer kind

in America, is very common on the Colorado river and the low mountain ranges in southern Arizona. They are a closely-built, fine looking animal, and some of them are almost as large as elk. Indeed, we saw one two months ago on the head of the Barbaomari creek, in Pima county, which seemed to us almost as large as the pony we were riding.

Mountain sheep and species of wild goat are found at various points throughout the Territory, though they have been nearly exterminated in many localities by Indians. We have been informed that ibex have been seen in the Santa Rita mountains, but the statement lacks confirmation.

A few elk yet remain in the northern part of Arizona, but there are none in the south that we have heard of.

Pecaries, or musk hog, are very plentiful in the southern part of the Territory. They are small animals of the hog kind, and grow to 60 or 70 lbs. in weight. These are the animals which Goldsmith, in his "Animated Nature," told us rested of nights by hanging their long tusks over the lower limbs of trees, and, thus suspended, sleep securely.

Gray fox are plentiful in all the higher tablelands of Arizona, and in the foothills of the higher ranges of mountains. Beaver are numerous along all the water courses. Of rats we have a number; the common wood rat, the big and little kangaroo rat, and a rat of the wharf species, with a file tail one-fourth longer than its body. Of mice, we have the common house, the kangaroo, the common field, and the little black mouse.

We have the large gray squirrel, the pine squirrel, chipmunk, the common ground, the bushy, striped tail, side striped, the flag tail, the lime tail, and perhaps one or two other varieties.

Of hares we have the black and white tailed jack and the Santa Fe, as it is called in Colorado, but here it is known as "cotton tail." The latter is the common rabbit of Eastern States, but is much smaller here. Our space will not permit of an enumeration of the birds of Arizona, which comprise a very large list. We shall therefore have to pass the feathered songsters; but as many Nimrods outside of the Territory would like to hear of our quail, we will close by stating we are bountifully supplied. We have the mountain and valley quail of the California species; chicken quail and the hawk-billed quail; both of the latter kinds we believe are found only in Arizona in the United States. The hawk-bill is usually known here as the "fool quail," owing to its peculiar way of squatting under cover and remaining there until stepped upon, or poked up with a stick. We also have the "bob white," though smaller than those in the States, with breast feathers of a reddish cast. It is found in the extreme southern part of the Territory between Tucson and Port Lobos on the Gulf of California.—*Arizona Citizen.*

An English Zinc Mine.

A remarkable find of blend at the Magpie mine Derbyshire, is exciting great interest in mining circles in England. The mine is near Bakewell, in High Peak, and has been worked for 300 or 400 years with the exception of a short interval from 1843 to 1869. In the latter year it was again opened out, but the proprietors had a prolonged struggle against water, the great enemy of lead mining in north Derbyshire. For nearly two years, pumping was carried on at an expenditure of 80 tons of coal per week. During this period the owners raised £19,000 worth of ore at a considerable profit; but in consequence of the great expenditure of coal, it was thought advisable to suspend pumping, and to get rid of the water by driving a level. This work was begun in 1873, and was finished in 1881, at a cost of £14,000, the level nearly 2,000 yards long, unwatering the mine to a depth of 196 yards. A few weeks ago Mr. Simmons, the captain of the mine, made the discovery of a seam of blend five feet wide, which increases in width the farther it is explored. Mr. Simmons regards the discovery as most wonderful and altogether unparalleled in England. He estimates that there are at least 50,000 tons of ore in the seam, worth £3 18s. 6d. per ton. The company is now making a road to its rich deposit, and laying down a four-foot track, on which the ore will be conveyed out of the workings. Twenty yards from this find of ore, the workmen came upon an immense natural cavern, 22 yards long, extending for 12 yards overhead and for an unknown depth below water. This cavern was sufficiently large to hold the whole of the debris excavated during six months, and was of great convenience to the company.

LIBERTY, IDAHO.—Bayhorse is having another excitement. The Mill Co. of the Ramshorn lode, located a mill-site near the junction of Bayhorse creek and Salmon River, which is about three miles below the old town of Etna, or Bayhorse. On hearing this fact the excitement grew immense; and the boys went down to the old ranch, known as the Bayhorse Crossing, owned and formerly kept by Frank Wood, and laid out a city and gave it the name of Liberty. Things are said to look lively up there. Fencing lots and making other improvements seems to be the order of the day. We have not been to the new city since its birthday; but intend to do so before it is a year old. Bayhorse can do almost anything, and we see no reason why she cannot build two or three towns. She has material backing, and enough to make them all wealthy locations. This is a warmer location by some degrees than the old town.—*Messenger.*

A Government Asked for Alaska.

Senator Cross has introduced the following concurrent resolution, requesting Congress to pass an Act providing for a civil government for the Territory of Alaska: Whereas, the mining and commercial resources of Alaska Territory are believed to be of great value, and many mining and business companies have been organized in San Francisco and elsewhere for the purpose of developing such resources; and, whereas, the honorable Commissioner of the General Land Office at Washington has decided that no applications for patents for mining lands in Alaska Territory will be received or considered by the Department of the Interior, Congress having failed to organize said Territory into a surveying district; and, whereas, the effect of this decision is to hinder and retard the development of the mineral resources and the settlement and occupation of the public lands in said Territory, and whereas, the said Territory of Alaska is without local government, and its inhabitants have petitioned the Congress of the United States to organize a Territorial Government in said unorganized Territory, and a bill is now pending before Congress with such object in view. Therefore, be it resolved, that the Senate in Congress be instructed and our Representatives be requested to use all honorable means in their power to secure the passage, at the present session of Congress, of an Act of Congress providing for a civil government for the Territory of Alaska.

California Production and Commerce.

The S. F. Journal of Commerce gives the following estimates and records:

Foreign Merchandise—Imports of '82.	\$4,767,968
Merchandise — Exports to Foreign Countries.....	49,625,198
Exports by Rail.....	60,000,000
Gold and Silver Coined by S. F. Mint.....	37,915,000
Precious Metals Produced.....	80,000,000
Lead Product on the Coast.....	8,500,000
Quicksilver Products, flasks.....	50,820
Wheat Crop of California, centals.....	29,500,000
Barley Crop, centals.....	6,000,000
Wool Clip, lbs.....	39,448,349
Value of Tea, Sugar, Rice and Coffee imported in 1882.....	16,233,659
Vintage, gallons.....	10,000,000
Value of Fruit Crop.....	5,000,000
Value of Pacific Coast Mining Industry, 1881.....	98,150,000
Lumber Receipts, feet.....	264,098,814
Population of California, Jan. 1, 1883.....	920,000
Population of Pacific Coast, Jan. 1, '83.....	1,850,000
Population of San Francisco, Jan. 1, 1883.....	280,000
Product Precious Metals on the Coast since 1848.....	2,378,146,186
Receipts of Coal, foreign and domestic, for 21 years.....	9,100,000
Exchanges at Clearing House.....	629,114,119
Inward Foreign Tonnage, 1882.....	1,060,033
Outward Foreign Tonnage, 1882.....	1,123,272
Inward Tonnage, Atlantic ports.....	117,341
Outward Tonnage, Atlantic ports.....	12,026
Steam Tonnage, entered.....	404,948
Steam Tonnage, cleared.....	413,643

Where not otherwise specified, the above figures represent dollars of value.

MINING OUTLOOK IN IDAHO.—The *Ketchikan Keystone* says: The year begins with many assured evidences of the greatest yield yet recorded. Scores of developed mines that have been idle during 1882 are to be worked actively in a very short time, and those that have well-forwarded explorations will be stopped, and thus add largely to the product of 1883. The new properties in every camp, not before known as producers, will swell the list of paying mines, and the placers will show richer returns than for the past half dozen years. It can readily be understood that profits will be larger because most of the mines have their plants of machinery in place, and the arrangements well perfected for steady and increased output. The cost of transportation and reduction of ores is less than has ever been known, and consequently the mineral as mined will bear shipment without the careful sorting into marketable grades once necessary. The close margins upon which ores are now bought, through the establishment of competitive bids, give a higher cash price to the miner than he has hitherto received, and thus everything conspires to stimulate production and encourage prospecting.

TRANSPORTATION CHARGES ON BULLION.—The Boise (Idaho) *Statesman* says: We learn that the U. S. Government has instructed Mr. Wolters, the Superintendent of the U. S. Assay Office, to no longer impose a transportation charge upon bullion deposited at that office for coinage, but to forward the same to San Francisco at the expense of the Government. The result of this order will be to effect a saving to depositors of 1% of the gross value of their deposits, and holders of dust and owners of placers will undoubtedly take advantage of this opportunity to increase their profits and get speedy returns for their bullion.

THE WOOD RIVER TIMES says hundreds of men are arriving every week at Naples, at the junction of the Wood River branch with the Oregon Short Line. Some go to engage in business, others to work on the railroad, while not a few are chronic bums, who drop into town utterly strapped and seeking a country where they may live without working. Some 40 teams and wagons also arrived at Naples and started for the end of the railroad grade toward Boise City. Five hundred additional men and 75 more teams will arrive there in the next two months and go forward with the O. S. L. to Boise valley as rapidly as materials can be delivered to them.

MECHANICAL PROGRESS.

"Steel-Iron."

The question of producing a metal possessing the physical properties of both iron and steel has for some time past received attention at the hands of practical metallurgists and others. One of the latest workers in this direction is Prof. M. Keil, who has succeeded in producing a compound metal which is stated to possess the characteristics of both metals. The Professor, in giving his experiences on the subject, states that the difficulties can only be alleviated when the two materials are intimately united into a whole. After many experiments success has, it is claimed, at last attended them, and a material has been produced answering every requirement, and to which the name of "steel-iron" has been given. The following five descriptions have been made: (1) steel by the side of iron; (2) steel between two layers of iron; (3) iron between two layers of steel; (4) the core of steel, the surrounding shell of iron; (5) the core of iron, the surrounding shell of steel.

This steel-iron is manufactured in the following manner: A cast-iron mould is divided into two parts by a thin sheet of iron securely fixed in it. The fluid steel, as well as the fluid wrought-iron, which have been freed before smelting from substances preventing welding, are poured at the same time, and in the same quantity, into this double mold; the separating plate serving as the medium welding both parts, steel and iron, completely together, so that they form an inseparable whole. The plate serves as a separator and a welding agent at the same time. The success of the operation depends upon the quality and thickness of the plate. The latter must be of a certain thickness, to prevent the two glowing and liquid masses burning through it; and it must not be too thick, so that they are able to bring it up to welding point while rising in the mold. The dimensions of the plates depend upon experience, and are naturally regulated by the dimensions of the castings. The manufacture of the above mentioned five kinds is the same in principle. In Nos. 2 and 3, however, the mold is divided into three equal parts by two strips of plate. In Nos. 4 and 5, the core is formed by a sheet iron pipe standing in the middle of the mold.

It is stated by Prof. Keil that the product thus obtained may be used for a good many purposes. Steel upon iron will be useful for rails, armor-plates and anvils, the hard steel face reducing wear and tear, and also, as in the case of thief proof safes and armor-plates, withstanding the attacks of even the hardest drill while the iron prevents cracking consequent upon heavy blows. Parts of machinery and tools which are subject to powerful pressure, and are exposed at the same time to great vibration are best made of the material with tough core and hard surface. The wear and tear would be slight, while the soft core imparts considerable strength and prevents fractures. From what has been said respecting the quality of this description of steel-iron, it will be seen that the extent of its application promises to be a wide one, partly on account of its undoubted excellence, partly also, from its many qualities, because it may be used for a great variety of manufactures.

Aid of Machinery to Labor.

Labor is a natural burden upon humanity; yet it is the key which unlocks the storehouse of wealth, convenience and luxury. By the use of inventions and applied machinery muscular work is greatly relieved, and results, cheaply and extensively obtained. In all this, however, intelligent skill is not supplanted, but rather there is a wider field created for the same, and more and more does it come into demand as the facilities for production multiply. Man, of course, may exist as our forefathers did, living in a rude and limited way on the necessities of life, and even these secured only at the expense of oppressive toil, but as improvements are made, and varied and enlarged benefits flow therefrom, he rises in the scale of being, and the sphere of life is extended. The easy supply of want in any direction only begets efforts in others, and as matters thus progress, instead of the demand for useful industry being diminished, there is more and more inducement to laborers to employ themselves with the exercise of every faculty.

It is a mistaken view, therefore, to imagine that there is the least tendency in the use of machinery to supersede the necessity of workmen, and take from them all opportunity to labor. Their skillful hands, discerning eyes, and intelligent brains are surely destined to find an ever widening field. Of course, the worker must not remain stationary, content to live and die an antiquated fossil, while all the world about him is changing and progressing. What he once did painfully and slowly with the hands alone he must now more abundantly accomplish through the agency of labor-saving devices and tools. Society has need of more production, and will only be satisfied with even more and more. With its prosperity and progress the laborer shares; and to-day he has more of the comforts and luxuries of life than were enjoyed by kings a hundred years ago. The prejudice against improvement, and the jealousy against capital and associations in their efforts to manage and direct production into more efficient and beneficial channels should disappear. As

changes occur, old ruts should be promptly abandoned. By adapting himself to circumstances as they are thrust upon him, there is not a man who cannot succeed and find a market for his labor far beyond his ability to supply.—*Dubuque Trade Journal.*

Forging a Rudder.

Referring to the forging of a new rudder for the steamer *City of Berlin*, to take the place of one that was carried away in a recent storm, Jas. Johnston, the superintendent of the Patterson (N. J.) Iron Co.'s Works, is reported to have said: "This is the biggest job of the kind we ever had, and there is only one other establishment in this country that would be anxious to get it to do. The shaft is 40 ft. long, the blade is 25 ft long, and the shape of the whole is so irregular that we have to put on counter weights every time it is handled, in order to turn it over under the hammer. It will weigh about nine tons. The blade is made of sheet-iron plates, bolted on each side of the frame. The frame is made of iron, about eight inches square. The open space between the two plates forming the blade is sometimes filled in with resin. This, when melted and poured in, forms the most durable and solid filling. Some, however, use plaster of Paris. Others fill in the space with wood. Finally, others perforate the plates and let water run in. This is probably as good as anything. The frame gives the rudder the desired strength. The plates are only to give a surface. A rudder six feet broad will steer a steamship 400 ft. long."

While the reporter was listening, the building was lighted with the brilliant glow of a red hot box of iron about 15 ft. long and eight inches square, just taken from the furnace. It was, in fact, a part of the outer rim of the curving rudder. In the meantime a corresponding piece projecting from the rudder shaft, which had likewise been heated, was brought from a furnace to be welded on. The two ends that were brought together were like two letter Vs pointing toward each other, thus: \angle \angle . Then several men with great tongs took from the fire two small pieces also shaped like letter Vs, made to fit on the space between the two ends to be welded. These smaller pieces were held in place until a blow or two of the great hammer, giving a 4,000-pound stroke, caused the half melted mass to adhere. Next the whole mass was twisted and turned, and the blows rained faster and harder, until in a few minutes the weld was completed. A similar operation welded the other end of the bow to the post.

"A single false blow," said the superintendent, "might spoil the whole thing. A bit of dirt in it might make a flaw that would cost us thousands of dollars for damages. It takes a good mechanic to boss such a job, and we have to pay him good wages."

"How much do you pay him?"

"We pay that boss hammerman \$12 a day. He is the most important man in the shop."

A SMOKELESS LOCOMOTIVE.—If the item which we copy below be true—that is, if the inventor has really been successful in discovering how smoke may be consumed and used in the employment of an agent for heating railroad cars without the use of stoves—he will be hailed as a public benefactor. The story runs: A locomotive is being built for the Erie railway in which Mr. Mallett's device for consuming smoke is to be tested. In order to give the invention a thorough trial a trip across the continent will be made. There is to be no smoke-stack on this locomotive, and in its place is to be a manhole merely. The air used to condense the steam is employed for heating and ventilating cars, being delivered through a conduit which, with coupling ends, passes along beneath the cars. This system does away with coal stoves or heaters, and supplies the cars with fresh air and warm air without danger of fire in case of a smashup, and also disposes of the cinders.

PAPER OR CAST-IRON FOR CAR-WHEELS.—We gave an item a few weeks since showing the safety of paper as a material for car wheels. Now we have a very satisfactory report on the strength and durability of cast-iron car-wheels, which we find in the report of accidents for November, published by the *Railroad Gazette*. It appears from the report that only three accidents were caused by broken wheels. Two of these occurred on freight trains and one on a passenger train. When we consider, continues the report, that probably more than 90% of all the car-wheels in the United States are cast-iron, and that at least 99% of the freight car-wheels are of this material, it will be seen that the record tells a remarkable story. We are inclined to believe that the proportion of cast-iron to other forms of car-wheels is largely exaggerated in favor of the former in the report referred to.

THE MANUFACTURE OF BESSEMER STEEL.—Official statistics show that the production of Bessemer steel ingots in the United States last year was 1,696,450 tons, being an increase over 1881 of 10%. The quantity of Bessemer steel rails produced in 1882 by the 14 completed works was 1,334,349 tons, an increase of 6% as compared with that of 1881. These figures do not cover rails made from imported steel blooms and open hearth steel rails.

SCIENTIFIC PROGRESS.

Sweeping the Skies.

A correspondent of the *Call*, of this city, writes as follows in regard to the great telescopes which are now in process of construction at Cambridge, Mass.:

A few nights ago I had the pleasure of viewing the heavens through the immense telescope just completed for the Russian government by Messrs. Alvin Clarke & Sons, the same firm who have the contract for furnishing the Lick telescope. The instrument made for the Russian government is the largest yet made. Indeed, the beauties of the celestial system are shown by Mr. Clarke's immense telescope. The instrument now awaits the arrival of Professor Struve, the royal astronomer of Russia, who is expected at Cambridge in a few days. He will test the instrument, and if it proves satisfactory (as it no doubt will) he will ship it at once for home. The glasses alone cost \$25,000. Sir William Herschel would have thrown away his big reflectors in disgust if he could have caught a glimpse of the heavens through this telescope. People who are not familiar with the progress of astronomy have no idea of the work that is being done in the great observatories of the world. With such an instrument as the one the Clarks have just completed, or with the one recently acquired by Princeton College, which lacks but one inch of being two feet in diameter, the geography of the planet Mars is somewhat wonderful. With the new Russian telescope, Saturn, Mars, Jupiter and the other great planets are a revelation to the observer. Saturn, 700 times as large as this globe, suspended in space in the middle of three or four concentric rings, which are nearly 40,000 miles broad, and more than 400,000 in circuit, but less than 100 miles thick, and turned edgewise toward the planet's equator, is indeed an object of wonderful admiration when seen through an immense telescope. They say that Saturn is not inhabited, for the reason that it, with Jupiter and the other large planets, is not yet cooled down and permanently crusted over like the earth. Saturn's atmosphere seemed to be filled with clouds, which presented a most picturesque appearance. Looking at the planet was like taking a station off in space, and watching the earth rotate, only the planet rotates much faster than the earth. Venus is exceedingly beautiful in the telescope, especially during the crescent phase. Work has begun on the Lick telescope, but it will be several years before it is completed.

Man and Animals.

There can be no doubt, says *Nature*, that dogs associate with barking in certain tones special emotional states in their companions. In fact, it is probable that dogs can in this way communicate with each other a wide range of states of feeling. But those states are present states; not past or future. They are their own states; not the states of others.

A dog can call his companions' attention to a worrisome cat, or he may have his own attention roused by the simple exclamation, "cat!" uttered by a human being. But no dog could tell his companion of the successful "worry" he had enjoyed, or suggest that they should go out for a "worry" the next day or evening.

And here we come upon what appears to be a fact which raises man so immeasurably above the level of the brute. The brute has to be contented with the experience he inherits or individually acquires. Man, through language, either spoken or written, profits by the experience of his fellows. Even the most savage tribe has traditions extending back to the father's father, or beyond. And the civilized man—has he not in his libraries the recorded results of many centuries of ever-widening experience and ever-deepening thought?

Thus it is that language has made us men. By means of language, and language alone, has human thought become possible. This it is which has placed so enormous a gap between the mind of a man and the mind of a dog. Through language each human being becomes the inheritor of the accumulated thought and experience of the whole human race. Through language has the higher abstract thought become possible.

ABSORPTION OF HYDROGEN.—It has been shown by W. Hempel that hydrogen is completely absorbed by palladium sponge at 100°, and he has used this as a means of separating hydrogen from a mixture of gases. In order to test the applicability of this property to the estimation of hydrogen evolved in sealed tubes, the author treated zinc with hydrochloric acid in a sealed glass tube containing a palladium spiral. The proportions of acid and zinc were such as to produce a pressure of 25 atmospheres, if no hydrogen were absorbed by the palladium. The absorption was found to be complete. A small portion of the hydrogen had united with the oxygen of the air remaining in the tube. Nearly the calculated amount of hydrogen was obtained from the palladium spiral by heating to 350°. The evolution of the gas was so regular that the author suggests the heating of palladium hydrogen as a means of obtaining chemically pure hydrogen.—*Amer. Chem. Journal.*

How A Man Walks.

One of the most remarkable things about a man's walk is the *diagonal* movement which characterizes it. The reader may imagine the hands and feet to form the four corners of a parallelogram, and the diagonal limbs are, of course, the right arm and left leg, the left arm and right leg. By "diagonal movement" we, therefore, intend to convey the fact that the diagonal limbs during locomotion always swing in the same direction. A soldier on parade keeps his arms motionless by his sides, and on no account must they be allowed to vibrate. This is not what he would naturally do if left to himself. Watch any one person out of the hundreds walking along the streets, and it will be seen that he invariably swings his arms as he goes along, perhaps to an extreme degree if he be a rustic, and less so if town bred. The arms swing by the body like a couple of pendula, and with a speed which entirely depends upon the rate at which he may be walking. The athlete, anxious to complete the given number of "laps" in a mile, or couple of miles, and outstrip his competitors, swings his arms to and fro with a quickness which corresponds with the motion of his swift feet; the business man also swings his arms with a motion which, if not so quick, exactly times with the motion of his legs; and even the idle man about town, lounging along some fashionable quarter, unconsciously gives a slow motion to his arms which corresponds to his tardy legs. Now, if the motion be even carelessly observed, it will be found that the right arm swings forward at the same time as the left leg, and when the right leg is advancing it is the left arm which accompanies it. This is the natural gait, and to convince one's self that it is so, it is only requisite to get a friend to walk across the room in the opposite fashion, *i. e.*, to swing the right arm forward when stepping out with the right leg, and then, in the same manner, when bringing forward the left leg to accompany it with the left arm. Such a gait is both unnatural and uncomfortable to the person who tries it, and also ludicrous to the observer who watches the first attempt of the kind. The diagonal movement of the limbs is the natural method adopted by man when walking, and it is the first and most apparent fact that one ascertains in studying human locomotion.—*Science for All.*

A NEW DANGER.—Two steamers, one the *Lima*, of the Pacific Steam Navigation Co., and the other the United States man-of-war *Alaska*, recently narrowly escaped destruction from falling meteors. Just after sunset on the 12th of December, a meteor plunged into the ocean close by the latter, and exploded with a great noise and a burst of flame just before reaching the water. All on board were terribly frightened. The particulars of the falling of a meteor near the *Lima* are not related. Of course, the danger from such accidents is no greater now than in years gone by; but, the rapidly increasing number of ocean vessels, and the more general spread of information in regard to this, through newspapers, etc., makes such occurrences more noticeable than formerly. A contemporary, in commenting upon this matter, says: "This is not the first time that meteors have fallen near ships, and there is nothing impossible in the suggestion that vessels may have been sunk by them. Meteoric stones have fallen on land which were heavy enough, and endowed with sufficient velocity, to knock a hole through any ship. Within the last 40 years more than 20 vessels have disappeared at sea. How many of them may possibly have been struck and sunk by one of these flying missiles from the sky, some of which follow in flocks in the tracks of comets, while others are lone wanderers in space until they fall within the earth's attraction, and plunge through her atmosphere with planetary speed?"

A THERMOSTAT CURRENT METER.—An ingenious adaptation of M. Breguet's well-known metallic thermometer has been made by M. Dubois, mining engineer. It consists of a fine spiral compound wire of platinum and zinc, suspended in a vertical direction and dipping at its lower end into mercury. Midway there is also a connection between the spiral and a mercury cup inclosing it, formed by two arms branching out from the spiral and dipping into the mercury. The upper half of the spiral is kinked in one direction and the lower half in the other, to prevent changes of atmospheric temperature from altering the zero of the instrument by acting on the Breguet spiral. The current to be measured is sent through the lower half, and heats it by overcoming the resistance of the compound wire. This rise of temperature causes the wire to turn, and, being fitted with an indicator and scale, the deflection of the thermostatic coil is read off.

JUPITER'S SPOT.—The continued change of longitude of the great spot in Jupiter is giving considerable force to the theory that the "spot" is an immense island of semi-cool matter, floating upon a liquid incandescent ocean surrounding the planet.

STUDYING NATURE.—Some one has said that nature has her language, and she is not unvarnished, but we don't know all the intricacies of her syntax just yet, and in a hasty reading we may happen to extract the very opposite of her real meaning.

was in town yesterday. The new works are about completed, and the stamps will be set in motion very soon. The Josephine is undoubtedly one of the best properties in the county.

MARIPOSA.

WHITLOCK'S MINING DISTRICT.—*Mariposa Herald*, Feb. 23: A gentleman who resides in this district, and who is well acquainted with the various mining enterprises in that vicinity, remarked to us a few days ago: "The prospects of the mines look well. The Teats mine is a flattering prospect, and though but little work has been done on it so far, a thorough development is proposed by its owner, Jacob Teats, the coming season. The Buena Vista and O'Gorman mines are both regarded as good prospects. Mr. O'Gorman intends to erect a 10-stamp mill in the spring, upon the Buena Vista mine. The site is graded, and everything is ready as soon as the machinery can be got to the ground. What the people there most need and desire is that capitalists will visit them and make a personal inspection of their mines, as they feel positive that their value can be easily demonstrated to any one who has the necessary capital to be profited thereby."

NEVADA.

THE CHAPMAN MINE.—*Nevada Transcript*, Feb. 23: At the Chapman mine there is about 200 tons of quartz ready for milling. A gentleman who was out that way this week, expresses the opinion that it will pay from \$12 to \$15 a ton. He says that even \$10 ore can be made to pay a good profit in that mine, as the ledges are of good size and easy to extract.

PLACER.

THE IRON WORKS.—*Placer Herald*, Feb. 24: The Iron Company at Hotelling is busy in its preparation for an early resumption of work. The buildings destroyed last September are mostly being replaced. The shed now in process of erection for the storing of coal is large, being 75x200 ft. and 18 ft. in height. They are also erecting a number of cottages which they intend to rent to their workmen. There is also a new structure going up near the furnace which, we understand, is intended as a residence for the Superintendent. The rebuilding of the place and the refitting up of the works is soon to be completed, and great caution has been exercised to prevent, if possible, a recurrence of the late catastrophe.

PLUMAS.

CRESCENT MINE.—*Greenville Bulletin*, Feb. 20: The machinery for the new hoisting works at Crescent mine is well under way at the Greenville Iron Works; water power will be used; the hurdy wheel now so much used being the form in which it will be applied.

INDIAN VALLEY.—The Indian Valley mill was started up by steam power on Monday, and will be kept running in this way until the reservoir is again full enough to permit of a return to water power.

SHASTA.

SOUTH FORK.—*Cor. Shasta Courier*, Feb. 24: A recent visit to the quartz find of Messrs. H. Dunham and J. P. Kingsbury, satisfies me that our incipient "boom" has some solid foundation. Their vein crosses Brincard gulch near Clear Creek. It is of good size and shows an abundance of free gold in the quartz. Messrs. Scott & Schroder have the south extension, which shows considerable rich ore. Messrs. Engle & Rutcheller have the north extension, and report a large ledge of good paying ore. Being somewhat inaccessible to other portions of the district, an adit will probably be built near Clear Creek, using the water of Kanaka. Further search will undoubtedly reveal other paying veins in that vicinity. Messrs. Brown & Zoellner, on Salt Creek, have their adit completed, and are waiting for water. They have a good ledge of fair grade ore. Twenty-five tons are at the adit, taken out in prospecting their ledge. Robinson & Co. have their adit completed, and will get started this week. W. A. Cooper has sold a half interest in his claim to W. Smith. They expect to put up an adit soon. The mines are looking well as usual. The cold weather has prevented the running of adits or mills the past two weeks.

THE BANGHART MINE.—The Banghart mine, four miles from Whiskeytown, and ten from Shasta, consists of a combination of claims, separately marked off to different owners, the entire location extending 3,000 ft. in length. The ledge is located on a mountain at the head of Mad Mule creek, at an altitude of 3,800 ft. and the lead courses north 60° and dips northeast at an angle of 40°. It shows a length of 10,000 yards, and has an average width of 180. The ledge formation is what is here called birds-eye porphyry, and lies between well defined walls of black slate. The principal work on the mine has been performed on the portion belonging to the original discoverer, W. Banghart. Sixteen small tunnels or drifts have been run in along the main vein and sides, aggregating 6,000 ft. in length, and the different upraisers and shafts aggregate a running distance of 3,000 ft. the deepest shaft being 250 ft. In working the mine the gold is principally found next to the slate walls, and the largest deposits at the intersections of multitudinous small veins of quartz, black manganese and oxidized iron, which run almost at right angles across the main vein. The gold extends back from the slate walls into the porphyry, but gradually grows finer in particles as it leaves the slate. The amount taken from this ledge foot up about \$70,000, and most all the work has been done by three men, and the only reduction machinery yet used on the mine is hand mortars and a small horse adit. The largest piece of gold yet taken out weighed 11 pounds, but quite a number of nuggets weighing nearly as much have been found, the beautiful specimen which took first premium at the last great Paris Exposition having been taken from the Banghart.

TRINITY.

THE WORST.—*Trinity Journal*, Feb. 24: The mining season of 1882-3 bids fair to pass into history as the dryest, and consequently the worst, ever experienced in this section. So far it has amounted to simply nothing.

TUOLUMNE.

TABLE MOUNTAIN BOOM.—*Tuolumne Independent*, Feb. 24: Since our last, miners in Table Mountain for miles in extent are developing their different properties with good results:

A. S. F. Co. which has purchased the Rough and Ready, is working the ground with hydraulic, and a good clean-up is expected. The claim is looked upon by miners generally as a drift claim.

The Montezuma Co. have re-timbered their tunnel entire 1400 feet, to the bed-rock on the opposite shore—exposing a bed of gravel over 300 feet wide, which averages very fair—in some places getting large prospects. The contractors have been engaged since June last in putting the mine in order, and will now commence to drift up and down the channel. This is a large property, and fortunes enough in it for a great many people.

The Boston claim is one that was worked years ago. Mr. Morris & Co. has been engaged for some time past in opening new ground, and was to have commenced last Monday taking out gravel.

The Empire, owned by Gen. A. J. Hatch & Co., of Nevada, have not fairly got to work as is their intention. The last account is that the gravel is paying about \$17 per day to the man.

Messrs. Beynau & Sons, in the old New York channel, have sunk a new incline for virgin ground. In early days this claim paid large sums to the owners, but a lawsuit on this same ground, in which Gen. Darrow and others were interested, closed down the works, and the claim has laid idle ever since. The Beynau's knew the ground, and have run a new incline—the old tunnel not being in a condition to work through. Last week, in a small drift, they took out 14 ozs. of washed gold, and there is plenty more left of the same sort. For a long time prior to this Mr. Beynau had been endeavoring to associate some one with him to help work the property for half the claim. He has now accomplished the object in his own family, and the mine is not now for sale.

GOLD CLIFF.—*Mountain Echo*, Feb. 21: Quite a number of men are at present employed in the Gold Cliff, and the mine has every appearance of being one of the richest discovered in this section for many years. Thirty stamps are kept daily pounding, and we understand that more are soon to be added.

Nevada.

WASHOE DISTRICT.

UNION CONSOLIDATED.—The joint Sierra Nevada east crosscut on the 2900 level is now in vein porphyry of a more solid character. It shows few seams of clay or quartz. The joint Mexican east crosscut on the 2900 level is making the usual progress, and is still in favorable ground. The new pumps at the Union shaft were started up on Thursday of last week, and are working well and smoothly.

SIERRA NEVADA.—The east crosscut on the 2700 level still continues in the cross course of cross vein. This vein has clay walls of considerable thickness. The north and south vein will probably soon be reached.

NORTH GOULD AND CURRY.—The shaft is cutting some quartz of a good appearance, and which seems to be increasing in quantity as work progresses.

HALE AND NORCROSS.—The north drift on the 2600 level, joint with Savage, is making good progress in vein porphyry. No prospecting will be done until the drift reaches the Savage south line.

OPHIR.—The station in the joint Mexican winze is completed, and the guides are all in place for the second line of hoisting cages.

MEXICAN.—The work of putting guides into the second hoisting compartment of the joint Ophir winze from the 2900 down to the 3100 level is completed.

CROWN POINT.—The old upper levels continue to yield about the usual amount of low-grade ore. Some prospecting for new deposits is now being done at various points and occasional bunches of ore of low grade are being found.

UTAH.—The west crosscut on the 1350 level is making good headway in a favorable formation, consisting of quartz, clay and porphyry. This crosscut will be continued until the west wall is found.

SAVAGE.—The north drift on the 2600 level, joint with Hale and Norcross, is making good headway, and is in a favorable formation.

POTOSI.—The main south drift on the 2600 level is making over 60 feet per week. The ground is a mixture of quartz, clay and porphyry of a favorable appearance.

ANDES.—The west drift is still in a mixture of quartz and porphyry of a promising character.

CALIFORNIA.—On the 2900 level the main south drift is being advanced at the rate of about 20 feet per week.

YELLOW JACKET.—Are shipping about 70 tons of ore per day. A considerable amount of prospecting is being done at various points, and more or less low-grade ore is being found.

ALTA.—Good progress is making in the drain drift which is to connect with the south branch of the Suro tunnel. The ground continues to blast out very well.

GOULD AND CURRY.—The west crosscut on the 2500 level is making rapid progress in vein porphyry, with occasional small seams of clay and quartz.

UNION SHAFT.—New pumps working well and smoothly. The hoisting of men and rock has been fully resumed.

COLUMBUS DISTRICT.

NORTHERN BELLE.—*True Fissure*, Feb. 24: The crosscut from the drift, at the bottom of the main winze from the fifth shaft level, has been extended 14 feet, its total length being 28 feet. It is still showing spots of rich sulphurets in the face. Crosscut No. 2, on the same level, has been advanced 11 feet without developing any change in the formation. A small quantity of excellent ore is being extracted from the stope above the fourth shaft level. The stope above the first shaft level continue to look promising, showing no diminution either in quantity or quality of the production of ore. There are no changes of note on the other shaft levels. The adit and levels above present the usual appearance. The stope above the ninth and tenth levels are holding their own remarkably well. The ore body in the winze, at the eastern end of the ninth level, has given out entirely, but sinking still continues with the expectation of its coming in again. Everything is running smoothly at the hoisting works, and all work in the mine is progressing in a satisfactory manner. Mill No. 2 is running steadily, and doing good work. Five of its stamps are employed in crushing a lot of 120 tons of fine ore from the Great Western mine, in Garfield district. For this reason only about 50 tons of ore, are being delivered daily from the company's mine, that being the full amount required to run the mill. The weekly shipments amounted to \$26,558.64 for the week ending February 22d, and aggregate \$58,974.79 on February account to the same date.

MOUNT DIABLO.—The stope above winzes No. 1 and 2, shows some \$65 ore that looks encouraging for opening. A body of \$75 ore, 2 feet in width, has been developed in winze No. 2. The intermediate drift, below the third level, and west of winze No. 4, shows a 4-ft ledge of \$50 ore, that is somewhat mixed with waste. The intermediate stope above winze No. 4, has opened several inches of ore assaying \$100, and is promising further developments. A small amount of \$150 chloride is being stoped from winze No. 1, between the second and third levels. Some eighteen inches of \$80 ore have been encountered in the west drift from the Callison winze. Considerable \$70 ore is being stoped from various places in the intermediate, below the first level.

TUSCARORA DISTRICT.

NORTH BELLE ISLE.—*Times-Review*, Feb. 23: Good progress has been made with the work at the station on the 300 level. Will be ready in a few days to commence crosscutting.

ARGENTA. South crosscut from winze is in 25 feet. Have commenced sinking below the drift, and this morning there is over two feet of rich ore in bottom of the winze.

GRAND PRIZE.—The north crosscut on the 700 level is in 137 feet, and has cut through a ledge showing some low grade ore—the quartz is very favorable looking. Have started a drift west on the ledge. Everything working well, and fuel continues to come in quite freely.

NAVAJO.—Since last report work has been resumed in the shaft, and as there will be no water to handle we will make good progress in sinking. Drift south, on 450 level has been extended 11 feet. The vein shows a little better width, carrying the usual grade of ore. Drift south, on the lateral vein, 350 level, has been advanced 15 feet; total length 107 feet. Stope throughout the mine are looking well, and yielding the usual grade of ore. Everything running smoothly at mine and mill.

WHITE PINE DISTRICT.

HAMILTON MINING PROSPECTS.—*White Pine News*, Feb. 24: Advice from Hamilton inform us that bodies of good ore are being developed in the Rescue, Stafford and Original Hidden Treasure mines at that place, which are the property of the Sweetwater Company. The Eberhardt tunnel is also said to be looking well.

Arizona.

A VERITABLE BONANZA.—*Alta Arizona*, Feb. 17: The Hackberry mine, owned by John Howell and others, is one of the best on the Pacific slope. Our present sheriff, Robert Steen, a mining man of sound judgment, told the writer over a year ago that he was familiar with all the great mines of Nevada and many of the mines of Arizona, and that he considered the Hackberry the best mine he ever saw. Recent developments of the Hackberry go far toward substantiating Mr. Steen's high estimate. This mine is situated something over a mile from the town of the same name and only about two and a half or three miles from the A. & P. railroad. It has an incline shaft of some 550 ft. in depth, probably the deepest shaft in the county, with two levels. At a depth of 270 ft we come to the first level having a drift running north and south of over 200 ft each way on the ledge. Work has been prosecuted with unabated vigor on the mine for over a year and some weeks ago a large body of ore, assaying over \$700 per ton, was encountered. Since coming upon this rich ore body, enough work has been done on it to prove beyond a doubt that it is a veritable bonanza. The second level is 400 ft from the surface and will soon be connected with the one above by a winze. The re-stamp mill at Hackberry will soon start up and then will be inaugurated an era of prosperous times at that place, the beneficial effects of which will be felt in every part of Mohave county. It is most fortunate that this rich strike in this deepest of Mohave county's mines occurs just as the railroad is coming to our relief. Situated as the camp is, the first to greet the eye of the capitalist or prospector coming from Albuquerque on the cars, its prosperity now fully assured, will be of incalculable benefit to the entire community.

SILVER DISTRICT NOTES.—*Arizona Sentinel*, Feb. 24: The Felicity mine of Silver district, owned by Capt. MacLeod and associates, is a good prospect and the active development of the mine will be commenced at once.

The Black Rock mine is turning out lots of good ore. A contract has been let to our old friend Mr. Juan Noriega to haul the metal to the smelter at Norton's Landing.

The Nevada mine is being worked by Dr. Stanley, and the quantity of metal taken is very encouraging.

The probabilities are that by the middle of April the Black Rock smelter will commence operations. The masons are now on the ground erecting a brick building and all the machinery and material is on hand to complete the works. This enterprise when fully under way will prove of great benefit to Silver district, as the company will purchase at liberal figures for cash all smelting ore offered them.

The Clip mill is rapidly approaching completion, and with its success will inaugurate a new era in the mining industry of this county. There are a large number of mines in this section that do not produce ore of sufficient value to ship, but which without doubt would pay handsomely to mill on the ground.

A custom mill to-day, in Silver district, would be a grandest factor in the success of that camp.

The Miners of Silver all wear smiling faces, and are happy, for at last they have every reason to believe that the camp is about to enjoy a lively and permanent boom.

Colorado.

THE JAMESTOWN EXCITEMENT.—*Georgetown Courier*, Feb. 24: A number of Georgetowners left for Jamestown yesterday. Mr. Hilderbrand made several assays of the ore from that district, which ran from \$35 to \$62 per ton. The dumps of many of the mines about Georgetown will run as well. Last week 8 tons of dump material from the Fred Rogers mine was milled, which returned \$44 per ton. The Moline tunnel has 7 ft of ore, carrying from 25 to 30 ounces of silver to the ton, and from 50 to 65 per cent of lead, and there are numberless mines in this vicinity carrying like bodies of ore, but can not be profitably worked on account of the extortionate charges of the Colorado Central railroad for transportation.

DUMONT.—Bids are being received for a contract to be let upon the Ohio shaft for 100 ft of sinking. An engine is to be erected shortly. The Albro never

presented a more promising appearance than at present, and also the Rosa. The Hancock property of the Clear Creek Co., upon which an adit is being driven, and which is in 70 ft, presents a very promising appearance. The Mansfield mill has started up, and will treat the free-milling ore from the Albro.

Idaho.

RICH STRIKE ON EAST FORK.—*Wood River News-Miner*, Feb. 17: We have frequently referred, during the past few months, to developments in progress on the Chloride mine, in the Gorman district on East Fork of Salmon, and mention has been particularly made of the fact that a tunnel was driving to intersect the vein at a good depth. The Chloride has, from the grass roots, always been a paying property, and the belief has been general among mining men that it bore indications of coming to the front as the leading mine of the district. This belief is now confirmed by developments made last week in the tunnel mentioned. Mr. Ole Rorem, superintendent of and interested in the Chloride, arrived Wednesday from the mine and states that the tunnel, which has been driven in 172 ft, tapped the vein at a depth of 130 ft, last week. The vein at the point of intersection has an exceedingly well defined vein of ore 6 ft in width. The character of this ore is antimonial silver and chlorides, and assays from \$600 to \$1,000 per ton, which is a marked increase in value over that taken from the surface. The surface rock, of which there are 600 sacks on the dump, mills from \$350 to \$500 per ton. The discovery of such a vein of ore at the depth of 130 ft, taken in conjunction with the flattering showing above ground, certainly places the Chloride in the first rank for permanency and intrinsic value, with the other properties of the district. Nor is the discovery referred to above all, Mr. Rorem, while running a cut on the surface, recently, encountered a body of galena about 40 ft up the hill from the main ledge, and from appearances it is a "breakover" from a 3 or 4 ft galena vein which he expects to find firmly "in place" with a little more work. Four men have been constantly employed for several months and will be continued in pushing drifts on the antimonial and chloride vein already cut, and in opening up the galena vein. The Chloride is situated 12 miles from Sawtooth and 8 miles from Galena, and is surrounded by properties which have been worked to a handsome profit for several years. It is of easy access; timber abundant and milling facilities numerous.

SMOKY MINING DISTRICT.—*Bellevue Chronicle*, Feb. 20: This promising camp is situated about 30 miles west of Bellevue, and is to all appearances a continuation of the great mineral belt on which are situated the Minnie Moore, Star, Bullion, and a number of the Deer Creek mines. Several claims in this new district have been sufficiently developed during the past season to insure them to be permanent and paying mines. The ores are of various kinds, consisting of carbonates, galena, gray copper, native silver, black sulphurets and zinc blend, and are generally of a class known as high grade, some of the ores assaying well in both gold and silver. One of the grand features of this camp is its extensive placer mines, which will doubtless be vigorously worked during the next summer and for many years to come.

New Mexico.

WILL START UP.—*Hillsboro Prospector*, Feb. 21: The new machinery is being put in order and in a few days the mill will start up. The company intend to light up with electricity and add new improvements from time to time. With the starting of the stamp mill and taking out and shipment of ore from the Paul Jones and Tellurium, by Mr. Dennis Findley, and the force put at work on the Copper King, all combined will give Hillsboro a start toward a business boom, and the output will certainly boom the reputation of our camp.

Oregon.

NOTES.—*Jacksonville Times*, Feb. 23: The head of the Sterling ditch is thawing out and piping is about to commence.

The prospects do not seem favorable for an extended run for many of the miners.

Dale & Son, who are mining below the Eagle flouring mill, have found new gravel beds that prove remunerative.

N. Cook, of Willow Spring, informs us that miners are at work in that vicinity and are able to do several hours work daily.

Klippel & Keaton, of Poorman's creek, are able to work 8 hours out of 24 by catching the water in their reservoir.

J. T. Layton, of Applegate, is hiring quite a force of men to clean out his long line of ditch, which work will take some time. He has not done much so far, but expects to make a good run yet.

The melting snow has enabled many to work their claim. There is an unusual quantity of snow in the mountains and those whose ditches head there will have an ample supply of water for a while.

Ross & Co., have purchased C. H. Barkdell's title to the quartz ledge in Blackwell district, which paid so well about two years ago, when \$600 was pounded out with a mortar in a short time. Prospecting will be commenced at once.

Most of the miners are busy at work since the pleasant weather began, but unless rain begins to fall soon, there will be a dearth of water. Those who rely on gulches and short creeks are not liable to do much this season, without the spring is late and wet.

Utah.

A REVIEW.—*Salt Lake Tribune*, Feb. 24: The week has been a quiet one in mining circles. The receipts of bullion for the week were \$706,870.47, against \$167,729.59 the preceding week. The shipments of metals from this city for the week ending Feb. 17, comprised 46 cars of bullion, 1,147,024 lbs; 5 cars copper matte, 103,000 lbs; 1 car bullion, 21,225 lbs, and 1 car refined lead, 24,160 lbs; making a grand total of 53 cars, aggregating 1,295,409 lbs. The shipments of the Horn Silver for the week are 24 cars, valued at \$72,000; previously reported for the current calendar year, \$466,500; total \$538,500. The Ontario shipments for the week are 4 bars valued at \$3,475.63; Frisco mine, 3 cars, valued at \$6,439.45; Silver Reef, two bars, valued at \$3,230. Bullionville shows shipments of 1 car, valued at \$1,467.69.

How to Foretell Frost.

EDITORS PRESS:—In a pamphlet published under the above title by the Signal Service Bureau, I find some statements which are liable to do a great deal of harm if acted upon. As these statements are put forward with the authority of the Signal Service Bureau, and as to find out their inaccuracy would require the investment of seven dollars in the purchase of a dry and wet bulb thermometer, it is better that their inaccuracy should be pointed out.

The principle involved in foretelling frost, as set forth in the pamphlet in the ascertainment of the dew point, it says:

"The ascertainment of the dew point is of great practical importance, particularly to horticulturists, since it shows the point near which the descent of the temperature of the air during the night will be arrested. For when the air has been cooled down by radiation to this point, dew is deposited, and latent heat is given out. The amount of heat thus set free being great, the temperature of the surrounding air is immediately raised. The same process continues to be repeated, and thus the temperature of the air in contact with plants and other radiating surfaces may be considered as gently oscillating about the dew point. If it rises higher the loss of heat by radiation speedily lowers it. Thus the dew point determines the minimum temperature of the surface of leaves on the ground during the night."

This quotation contains the gist of the pamphlet. Find the dew point before retiring for the night, and then you know how low the thermometer will fall and whether a frost is to be expected before morning. A few figures from the meteorological journal which has been kept for the last few years at my sanitarium on St. Helena mountain, will suffice to show the inaccuracy of this statement. I will merely quote from my journal the records at the time of our earliest and latest frosts, although it contains many more striking instances of the fallacy of the law.

Date.	Hour.	Dry.	Wet.	Dew point.	Therm. on grass.	Remarks.
1878.						
April 19.	9 P. M.	39°	38°	30°	20°	Sharp frost, potatoes cut down.
May 28.	9 P. M.	42°	40°	33°	20°	Beans killed, corn cut off.
Oct. 12.	9 P. M.	45°	43°	40°	25°	Sharp frost.
1879.						
May 14.	9 P. M.	43°	41°	30°	28°	Heavy frost, killed beans, tomatoes.
May 21.	9 P. M.	45°	44°	42°	30°	Frost.
Nov. 9.	9 P. M.	37°	36°	35°	29°	Heavy frost.

These figures suffice to show that with a dew point at 38°, or even 42, at night, damaging frosts may occur before morning, and the temperature, instead of oscillating about the dew point, generally descends many degrees below it. From a table of observations which, by a most extraordinary infatuation, has been published in Lient. Allen's pamphlet as illustrating the application of the law of oscillation about the dew point, I will cite a few figures which furnish the strongest evidence that could be adduced against it:

	Dew point at 11 P. M.	Min'm during the night.
Campo, Cal.	6°	32.2
Fort Verde, Arizona.	36°	31.9
Pioche, Nevada.	9°	32
Fort Grant Arizona, Nov. 2.	36°	32
" " " " 3.	18°	32
" " " " 10.	39°	32
" " " " 24.	19°	32
" " " " 26.	20°	32
Fort Gibson, Nov. 27.	36.2°	32.5
Prescott, Arizona, Nov. 29.	43°	32

Here we have instances of the dew point varying from 5° to 43°, or a difference of 38°, and the minimum temperature during the corresponding nights not varying more in any one instance than 0.6 of a degree. In the Fort Grant observations, we find the dew point at 11 P. M. varying from 15° to 35°, and yet in every instance the minimum temperature reached during the night is exactly the same, or 32°, a pretty example of the manner in which the minimum temperature oscillates about the dew point.

The fact is, nearly the whole of the pamphlet is a barefaced plagiarism from Buchanan's introductory text-book of meteorology, published in England in 1871. In that country, owing to the atmosphere being generally nearly saturated with vapors the indications of the wet bulb in connection with frost have a certain importance, as when a portion of the vapor is deposited as dew there is an unlimited supply to continue the precipitation and thus keep up the temperature. Besides this, the large amount of vapor in the air diminishes radiation so that the night temperature does not fall so readily. A full discussion, however, of the climatic differences between the two countries as they affect the indications of the dew-point would lead me too far at present. It is an interesting question, and I hope to find time to ventilate it before long.

From observations recorded in my journal, and from the figures contained in Lieut. Allen's pamphlet (the correctness of which I have very much doubt) it is evident that the minimum original temperature instead of oscillating about the dew-point, sometimes falls 17° below it, and at other times remains 24° above it, thus rendering the evening dew-point a very fallacious guide for indicating frosts.

JAMES BLAKE, MD.

San Francisco, Feb. 9, 1883.

The Mines and Census.

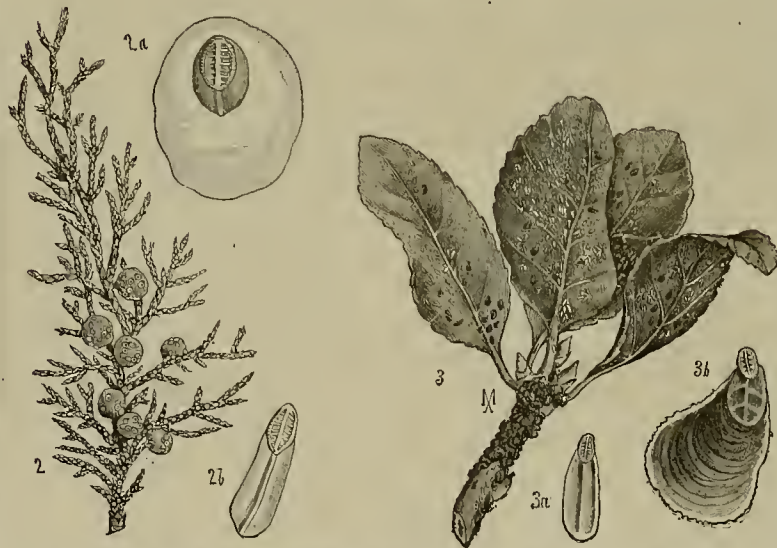
The second edition of the compendium of the census will be published in a few days. From advance sheets it appears that the total production of gold for the census year was \$33,609,663, and of silver \$47,170,957. The report states that, in addition to the returns received directly from the miners, there are several minor points to be included in the total yield. A larger item than it is usually considered to be is the annual handling of rich specimens. This is not accounted for in the mine productions as reported, while it is impossible to state the actual amount absorbed with any degree of precision. A careful estimate would place the value of gold nuggets and ore annually added to the cabinets of collections at not less than \$150,000, and that of silver at about \$50,000.

This, in view of a great number of mineral collections maintained throughout the mining territory, is certainly not an overestimate. There is quite an extensive manufacture of gold quartz into jewelry and souvenirs, particularly in San Francisco. The value of the gold so ab-

gold yield and less than three per cent. of the silver. A similar divergence is observed in other portions of the mining region, the two precious metals occurring side by side, but often in widely disproportionate quantities.

Diaspinae.

We give on this page a handsome engraving of two species of scale insects belonging to the genus *Diaspis*, and one of another genus which is closely allied thereto. The engraving is from Prof. J. H. Comstock's Report to the Department of Agriculture, in which his investigation of California insects is recorded. Fig. 1 is the "rose scale" (*Diaspis rose*), which may be found in many gardens in our State, and in other States. Fig. 1 shows the way the insects mass themselves upon the twigs of the rose. Fig. 1 a is the female scale insect, and Fig. 1 b is the male scale, both enlarged. This insect is a grievous pest to the raspberry and blackberry plants, and must be exterminated to ensure



SCALE INSECTS INFESTING THE ROSE, THE JUNIPER AND THE EUONYMUS.

sorbed probably does not fall short of \$5,000 annually. In 1870 the United States Mining Commissioner estimated the amount of gold hoarded as specimens or worked up by local jewelers at \$40,000. The same authority estimated the annual loss of gold dust in handling as currency at \$100,000, but the practice of using dust for money has almost disappeared, and the amount so lost is now very small. Another indefinite quantity is the value of the precious metal lost in melting, assaying, etc.

A study of the relation of production to population develops some curious figures, ranging from an average of one mill per capita in Nevada, the intervening series indicating, with great precision, to what extent mining is a factor of wealth. In several localities the product per square mile varies from one cent, in the case of Alaska, to \$18,520 in that of Colorado, the intermediate average forming another standard of developed mineral resources, so far as the precious metals are concerned, from a different point of view, roughly corresponding to that of the relation of production to population.

The leading mining States are Colorado, California and Nevada, followed by the Territories of Utah, Montana, Dakota, Arizona and Idaho, in the order named. The proportionate amounts of gold and silver furnished by each vary greatly. Thus, while Colorado furnishes 40% of all the silver in the United States, it yielded but eight per cent. of the gold. California, on the other hand, is the source of over half the

good growth and fruiting. It is destroyed by spraying with a solution of concentrated lye, half a pound to a gallon of water, or by other effective insecticidal solutions.

Fig. 2 is the juniper scale (*Diaspis Carulei*), which is found abundantly on the junipers' and arbor vitae at the East, and Fig. 3 is another closely allied insect infesting the euonymus, which, because of the oblong form of its scale, is placed in the genus *Chionaspis*, and is named *Chionaspis euonymi*. This insect infests the euonymus in the Eastern States, but at the south and at Havana is found upon orange trees.

PLANT EVAPORATION.—The amount of water which passes through the roots of a plant is something enormous. Dr. Laws, of England, has proven that an average of 2,000 lbs. of water is absorbed by a plant for every single pound of mineral matter assimilated by it. It has been shown at the French Agricultural Observatory, at Montsouris, that 7,02 lbs. of water pass through the roots of a wheat crop for every 104 lbs. of grain produced. These 727 lbs. of water are required to produce one pound of grain. It is also found that more water is needed on poor soil than on rich. Good, rich soil will produce a pound of good grain by the absorption of 727 lbs. of water, while very poor soil requires 2,700 lbs. of water to give a pound of very poor grain.

Genesis of Metalliferous Veins.

At the last meeting of the Academy of Sciences, held on Monday evening, Prof. Joseph Le Conte, of the University of California, read a very interesting paper on "The Genesis of Metalliferous Veins." We have space for a brief extract only: "The phenomena of metalliferous deposits by saltiferous action at Sulphur Bank, California, and Steamboat Springs, Nevada, had tended to confirm what he had previously believed to be the most probable theory of vein formation. The structure, mode of occurrence and contents of these veins no longer leave any room to doubt that they have been formed by deposit from solutions. If any doubts still linger in any mind on this subject, they are now dissipated by the phenomena of deposit, still in progress at Sulphur Bank and Steamboat Springs. The question is now settled forever that metalliferous veins are deposited from liquid forms. He is satisfied that the old theory of sublimation must now be abandoned, and minutely described the process of deposit from solution, constantly going on at Sulphur Banks, through the agency of up-coming solfataric waters, when recently liberated from greater pressure and super-heated conditions. When such solutions approach the cooler surface of earth's crust, they are relieved and enabled to precipitate metallic substances along their lines of percolation, or in fissures, forming veins. In studying the conditions of deposit we must bear in mind that the magnificent chemistry of nature is far more subtle and refined than that of the best appointed human laboratory; and substances which are regarded as practically insoluble by man, cannot be so regarded in the great laboratory of nature.

The infinite patience of nature and the infinite slowness of her operations, must be taken into account. In the perpetual circulation of subterranean waters, infinitesimal deposits continued and accumulated through almost infinite time, producing large results. Thus mineral veins may be composed of substances of extreme insolubility and yet be deposited from solutions. In fact such extreme insolubility, or at least very feeble solubility, appears to be a condition of mineral vein formations, for otherwise the minerals would in most cases be brought to the surface, instead of being deposited below. Solubility is notably increased by heat, especially super-heat, and by pressure. This beautifully illustrates the law of correlation and conservation of natural forces, furnishing an example of the equivalency of mechanical and molecular forces. There can be no doubt that the solvent power of water may be increased, without apparent limit, by a corresponding increase of heat and pressure. Hence waters deep in the interior of the earth, especially in volcanic regions, where they are under heavy pressure and super-heat, have their solvent power greatly increased. Such waters coming up slowly toward the surface through fissures, would have their solvent power diminished both by cooling and by relief from pressure, and must of necessity deposit in their courses, and thus form mineral veins.

The Commonest Forms of Metallic Ore

Are metallic sulphides. The solubility of silica in alkaline carbonates is well known. He spoke of organic matter as a universal reducing substance, with which all these solutions came more or less in contact. Hot solfataric waters, circulating at great depths, are necessarily under heavy pressure, and we know they contain alkaline carbonates and alkaline sulphides and will take up silica, earthy and metallic carbonates and metallic sulphides, which they will deposit, partly by cooling and partly by relief from pressure and heat, as they come slowly toward the surface and thus form metalliferous veins. Chemical reactions also facilitate the process. The more we study the chemistry of nature the more we are impressed with the importance of organic matter as a universal reducing agent. It is quite probable that organic matter circulated in the same solution with metallic sulphates and was a frequent means of reducing these and depositing them as metallic sulphides. There seems to be a reaction at the California Geysers, where a black, inky deposit of iron sulphide is produced by the action of alkaline sulphide on iron sulphates. Had this reaction taken place sufficiently slowly, the sulphide might have been crystalline. All these methods, and perhaps many others not yet imagined, may occur, but the first, viz., by cooling and relief from pressure, is probably of most universal occurrence.

He believed many subterranean waters to be in that very slow condition of movement most favorable to the deposit of minerals in fissures, where the leaching process proceeds, contributing something from the wall rocks, but the main supply of metallic substance comes mainly from the depths, under conditions of pressure and super-heat. Nearly all circulating fluids terminate their movements on the surface. Metalliferous veins are formed by saltiferous action, which has been preceded by volcanic action. He alluded to the copper and silver-bearing sandstones of Utah. Sedimentary rocks derive their mass from the disintegration of igneous rocks, hence the marvelous variations in vein constituents. Few metallic deposits are richer at greatest depths. The crust of the earth in common with all material things is constantly progressing along a perpetual cycle of changes. He spoke of gold veins as the most difficult to account for, but explained clearly their methods of deposit in full accord with the rules here laid down. In solfataric springs he claims that nature's process of vein deposits is clearly revealed, and their study is invaluable.

THE ENGINEER.

American Steamboats Sweep the World.

There is apparently a large and extended market for American flat river steamers on the shallow navigable rivers of Europe and Asia. In China they have already effected almost a revolution in the water-carrying trade of that empire, and we hear that there is a brisk demand for them already on the Volga. The plan adopted in that case by the American builders is to take out the machinery with them, and to build the steamers of timber on the spot. This plan produces a steamer much cheaper than the iron river steamers exported from England, which have been in use there for some time. Not only is their success due to that cause, but more especially owing to the fact that the American built boats only require a draft of four feet, while most of the English steamers require nine feet. Even a draft of five feet bars the navigation through a great portion of the river, and the speed of the wooden American boats is said to be better than that of any of their iron competitors. The light draft of the American boats has opened up a navigable length of some 2,000 to 2,300 miles on the Volga, which will probably induce considerable further orders for the other large rivers of Russia. There should be an equally good market for such steamers on the rivers of the Argentine Republic, which are very wide, but for the most part shallow. We understand, however, that there is a strong prejudice against them, owing to their liability to catch fire—the first two which were run on the Plate having been destroyed by fire. We do not see why America should have a monopoly of such flat-bottomed river steamers, and we recommend this to the attention of English ship builders, though, as a nation, we are said to be the last to suit our goods to customers' requirements. —*Marine Engineer.*

A REMARKABLE RECORD FOR SAFETY.—It is very easy to make an assertion, but it is not always easy to prove it. This, however, is not the case in the present instance. When it is said that the New York, Penn. & Ohio railroad has a record for safety possessed by few, if any, railroads in the country, the assertion is not made as an idle boast, but can be borne out by substantial proofs. But one passenger has been killed in the history of the road, and that was through no fault of the company. It was caused entirely by the person's own carelessness. With this exception not a single other passenger has been killed or seriously injured. This certainly is a remarkable showing when it is considered that it covers a period of 22 years, and is exhibited by a road that forms a part of one of the great trunk lines between the East and the West, over which a large volume of travel is constantly flowing. This record has not been the result of accident; it has been brought about through the utmost care in every department connected with the construction and operating of the road. The building, keeping up and equipment of the road has always, during the 22 years of its existence, been first rate in every particular. Equal attention has also been paid to the personnel. None but the most competent men are put forward as officers and managers, or engaged as employees. Eternal vigilance has been the price of safety, and it has paid in dollars and cents as well as in the saving of life and limb.

RAILROAD BUSINESS.—There are now 115,000 miles of railway in the United States, which, reduced to fair values and excluding "watered stocks" have cost, with the equipment, more than \$5,000,000,000. This sum is more than one-tenth of the value of the whole property of the people of the United States, including private lands, and more than one-fifth of the whole capital which the products of labor have placed upon the land. In 1881 the railroad employed in operating the roads and in construction 1,600,000 persons, equal to a seventh part of the male adult population of the United States. In the same year they paid out \$450,000,000 for wages and material. These figures show the very great relative importance of railway property in this country, and the vast demand for labor which its service creates. In 1881 the railroads of the United States moved 350,000,000 tons of freight. Of this tonnage more than nine-tenths was made up of food, fuel, and materials for shelter, commodities in which the working people—using that term to distinguish the great body of the people from capitalists, as a class—have a common and equal interest as consumers.

AMERICAN RAILROAD SYSTEM FOR JAPAN.—Recent advices from Japan report that the intention of the Japanese Colonization Department is to adopt the American system of railroad building in the extension of the railroad system in the northern part of the Empire. This decision is attributed to the economical and satisfactory working of the railroad from Sapporo to the sea coast in Yesso. This road was built by Col. J. A. Crawford.

USEFUL INFORMATION.

Spotting of Looking-Glasses.

A trouble of this kind is frequently met with by housekeepers. It is generally caused by undue exposure of the glass to the sunlight, or to the heat of a stove or fire-place. It is not as generally known as it should be, says the *Manufacturer and Builder*, that the amalgam with which looking-glasses are coated, to give them their perfect reflecting property, is very readily crystallized, when exposed even for a short time to direct sunlight, or to strong heat from a stove or fire-place. A mirror, hung where the sun can shine out, is soon spoiled from this cause, taking on a granulated appearance, which is familiar to most housekeepers. Where this action is allowed to proceed for some time, it involves the whole of the amalgam surface that is exposed, and the glass becomes worthless as a reflector. The continuity of its reflecting surface is destroyed, and it ceases to reflect the outlines of objects with precision. To avoid this trouble, care should be taken in hanging; if a glass is placed where the direct rays of the sun can strike it, it should be covered during that part of the day in which it is so exposed. It is better, of course, to hang it where it will not be exposed; but this is not always convenient, especially with large and expensive glasses, for which in modern houses there is usually provided a space for their reception.

Where granulation has already commenced, its further progress may often be checked, and the glass preserved, by simply changing its position. As above remarked, looking-glasses will be spoiled as well by the action of heat, as by that of direct sunlight. It is, therefore, important to avoid hanging a mirror near a stove or fire-place, where strong radiant heat will reach it. If this precaution is neglected, granulation is likely to occur, even in a comparatively dark room, from the action of heat instead of light. Another thing to be avoided, is having a lamp or gas jet burning too close to the glass, for though the heat may not be sufficient to crack the glass, it will often bring about the same injurious granulation. By observing the precautions above given, many of our readers may avoid future difficulty. A looking-glass can be re-silvered for about one-sixth or one-fifth of its original cost.

EMPLOYMENT OF MULES IN COAL MINES.—Upwards of 1,700 mules employed by the Philadelphia and Reading Railroad Coal and Iron Co's, in connection with mining operations toil underground daily. At many of the mines the mules do not see the light of day for a year at a time, and very often a mule spends ten years of his life underground. The effect of daylight upon mules that have been so long in darkness is blinding. In many instances this blindness is permanent, the shock of sudden light being too great for the eyes; but it is the general rule that the mule staggers around in blindness for a few days, always, however, finding his way to the feeding bin, and taking true aim with his heels. At the end of the week, eyesight returns; he brays with all the vigor of lung for which his kind is celebrated, elevating his tail as an accompaniment. There are, in round numbers, 2,300 mules employed in all capacities by these companies. Many of them are taken up and down on the cage at the mines daily. In an economic point of view, they are said to be 33% cheaper than horses, but that this is offset by the risk run in employing them.

THE GLUCOSE BUSINESS.—It is stated by those connected with the trade, that the glucose business is in a bad way; that most of the factories throughout the country are closed, and that glucose is selling at a lower price than when corn was but 30 cents a bushel. The enormous profits realized by those who first went into its manufacture created a boom which led to the building of factories all over the country, till there has been an over-production. Meanwhile, the novelty has worn off, and the public has learned that it is a spurious, bastard product, having a low intrinsic value, and its use and consumption have greatly fallen off in favor of straight sugar goods. The charges that it is objectionable on sanitary grounds, and injurious to health, have never been proved, and it is doubtful if they can be sustained. Its growing unpopularity arises mainly from the fact of its low sweetening properties, only about two-fifths that of sugar syrups, together with more or less of prejudice, on the ground that it is unwholesome. —*Chicago Grocer.*

CORK SHAVINGS FOR VINEGAR.—The wood shavings commonly employed in vinegar factories preserve their activity for a certain length of time, and then become useless. Bersch explains this on the supposition that the shavings, becoming saturated with liquid, get heavier, and press down on those beneath so hard as to prevent the air from circulating through them. He, therefore, recommends the substitution of the waste cork from which stoppers, etc., have been cut, for the wood chips. The elasticity of the cork is increased by moisture, so that they cannot pack together, even in the tallest tanks. Small organisms exist in the pores of the cork, and among these, many vinegar bacteria, so that the cork is very active in making vinegar.

ELECTRICAL GLASS CUTTING.—At present, large glass cylindrical vessels for scientific and commercial purposes are cut during manufacture by surrounding them with a thin filament drawn out from the molten glass, and then cooling them suddenly by contact with a cold substance. A more sure and perfect method has been devised by Herr Fabolt, of Dresden, who surrounds the glass with a copper wire, connected by binding screws with the two poles of a galvanic battery, and made red-hot by forming contact. The rough edges are then rounded off by turning the object round in a blowpipe flame; and, to prevent any unequal contraction of the parts subjected to this action, a slight annealing is effected in the furnace—*Iron.*

SPEED OF CANNON BALLS.—The highest velocity that has been imparted to shot is 1,626 ft. per second. This is equal to a mile in 3.2 seconds. The velocity of the earth at the equator, due to rotation on its axis, is 1,000 miles per hour, or a mile in 3.6 seconds. Therefore, if a cannon ball were fired due west, and could maintain its initial velocity, it would beat the sun in its apparent journey round the earth.

THE BEST QUALITY OF CHARCOAL is made from oak, maple, beech and chestnut. Wood will furnish, when properly charred, about 20 per cent of coal. A bushel of coal from pine weighs 29 pounds; a bushel of coal from hardwood weighs 30 pounds; 100 parts of oak make nearly 23 of charcoal; red pine, 22.10; white pine, 23.—*Exc.*

AN ELECTRIC RAILWAY, for the purpose of carrying passengers around the inside of the gallery of the building, will be one of the features of the Exposition of Railway Appliances to be held in Chicago, May next. The length of this railway will be about one-third of a mile.

MEN TO A MILE.—The total number of employees on the 22,184 miles of railway belonging to roads terminating in Chicago, as reported to the State railroad commissioners, is 111,023. This is almost exactly five men to a mile.

GOOD HEALTH.

The Care of Infants.

EDITORS PRESS:—Having read in the *Rural Press* an inquiry from a lady in Napa, for a remedy for costiveness in infants, and after answering the mother, C. D., by letter, I fear she may not look for an answer through the mail as she did not give her full name, so I take my pen to tell you what I know about children. Give them plenty of warm flannel, good care and good air, a bath every morning in a warm room, in water about blood-warm, have a bath-sheet to dry them in—never a towel, as it chills them. Dry and rub with a warm hand thoroughly, dust with ground starch or French-powder, dress in loose warm flannel, and a slip without starch around neck or sleeves. Let them sleep, sleep, sleep. Never trot or jump the baby.

Feed as regularly as one can, with meals not too near together (though I never could feed by rule) I found all the grain, excellent cooked without sifting, but cook well, and the milk of one cow, best a young new milch cow, that grew with baby.

I found an infant syringe indispensable to have healthy, regular children. I use water about the temperature of the bath, with a little castile soap in the water given with the infant syringe every morning, before or after bath, all that baby needed, and some of my children have never had medicine for costiveness, and never any of them had colic, as is usual with babies, although I never ate cabbage, or pickles, or vinegar, or stimulants of any kind while nursing. They would sleep all night and play all day, when awake, with one exception. My baby boy, born the 27th of December, in very cold weather, under care of the nurse, in drying and powdering, although very careful, the skin was broken, and it was quite bad before I felt it was serious at all. It continued to get worse, and I thought it must be kept scrupulously clean; a mistake however, as I did not give the tender new skin time to form and heal. I sent for Dr. Robinson, of Colusa. He is on the State Board of Health, and one of the best doctors in the interior. He gave me zinc salve to put on and leave alone. It acted like magic, and since then one of my neighbor's baby boys had the same trouble very badly. I sent some of the salve to the distracted mother (for the child screams continually with the soreness), and it cured her child, and now they are never without the salve in the house. I am sure Dr. Robinson will not object to my writing this after seeing how my poor baby was relieved.—*MRS. LITA M. PETERSON, Maxwell, Cal.*

BLOOD DIET.—A French savant, M. Regnard, has been lately trying the effect of a "blood diet" on lambs. Three lambs, which for some unexplained cause had been abandoned by their mothers, were fed on "powdered blood" with the most gratifying results. The lambs increased in size in the most marvelous fashion, and attained unusual proportions for their age. The coats of wool also became double in thickness. Encouraged by his success with the lambs M. Regnard is now feeding some calves on blood.

Treatment of Heart Disease.

There seems to be almost everywhere, a growing complaint of heart affections, and the *Medical and Surgical Reporter*, of New York, had an article recently on this subject, in which rest is recommended as the best remedy for some kinds of heart troubles.

By this, says the editor, we mean not positive, but comparative rest; neither do we refer to inflammatory affections of the heart, wherein, from the very gravity of the disease, confinement to bed and consequent rest become necessarily assured. We are thinking of those cases of heart exhaustion, so to speak, of individuals whose general health and tonicity is much run down, from overwork or abuse, and in whom the heart shares in this general vitiation. Possibly the organ is not in itself diseased; its organic integrity may be perfect, but its muscular walls may be flabby and weak, ready to yield, or, more properly, unable to resist any great strain. If, when in this condition, the man resorts to any violent muscular exercise, or subjects himself to the influence of violent physical emotions, this weak heart may become mechanically distended in its efforts to perform the extra labor demanded of it. Or, it may be, that dilatation has already taken place to some extent; then does it become important to allow the organ time for the development of the beneficent hypertrophy that will do so much to preserve its integrity.

By rest we mean to advise your patients who are threatened with or already have dilatation of the heart to do everything slowly, to perform every act of life deliberately, and to avoid, as far as possible, all occasions calculated to excite the passions or emotions. We must ever remember what a delicate machine the heart is, and how easily it can become deranged, and realizing this, must consider how much more care this organ requires when it is already diseased. We must, under such circumstances, walk slowly, think slowly, eat slowly—in a word, do everything slowly. It is not well, and we do not recommend the carrying of this advice to the verge of laziness; but what we do mean is that while it is well for all (either sound or diseased) to avoid hurry, it is 10 times more important, aye, absolutely imperative, for the man with a weak or diseased heart.

MALARIA IN NEW ENGLAND—SUGGESTIVE

FACTS.—A short time ago the key to the mysterious extension of malarial diseases in New England was supposed to have been found in the damming of the streams for manufacturing purposes. Now the *Boston Advertiser* says that intelligent people living in the districts invaded, say that the appearance of malaria in New England dates from the introduction of the cultivation of tobacco on a large scale upon the intervals of the Connecticut, and that its spread has kept even pace with the extended growing of this crop. The most plausible theory of the introduction and propagation of the aerial poison is this: The tobacco crop is a proverbially exhaustive one. To keep up the productiveness of the soil fertilizers are freely used. The manure is brought from New York City, mostly in scows, which are unloaded on the banks of the river where the cargo is to be used. All the autumn and winter these heaps of putrid matter are fermenting and breeding disease. The air that comes in contact with these piles of filth is contaminated and rendered unfit for human lungs to inhale, as it is offensive to the senses.

THE DECAY OF TEETH.—From a recent examination by Dr. Franzius, of the teeth of 650 soldiers in Russia, it appeared that 258, or nearly 40% had dental caries. He finds that, of all the teeth, the third molar is most often affected, such cases making up one-half of all the cases. The teeth are affected in a certain successive order; first the lower third molar is attacked, then the upper, then the lower fourth molar, and so on. The incisors and the canine teeth of the lower jaw stand last in the line. The durability of the upper teeth stands to that of the lower as three to two. The teeth in persons of fair complexion and hair are less durable than those of dark complexion and hair (40 to 37%). Stature has a manifest influence on the durability of the teeth, which increases with decrease of height, and *vice versa*. (Dr. Franzius seeks an explanation of this curious fact in a less perfect outer circulation in tall men than in short men.) The right teeth show a greater vitality than the left. The conditions of the soldier's life do not show any harmful influence on the state of the teeth.

GENERAL PARALYSIS.—Dr. Philip Teuner, in the *Cincinnati Lancet and Clinic*, defines the disease as an affection of the anterior portion of the cerebrum, of that part which the study of comparative anatomy and anthropology indicates to be the seat of intelligence, and which modern experimental investigations indicate to contain the motor centers. The pathological anatomy consists of changes in the membranes of the brain, usually most marked in the anterior portions, as well as changes in the cortex and subcortical regions, affecting chiefly the anterior cerebral convolutions. Its earlier symptoms consist chiefly of morbid manifestations of intelligence, such as want of judgment, loss of memory, boastfulness, etc., and of failure of the motor functions occurring simultaneously and progressing correlatively with the mental disturbances.



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SAN FRANCISCO:

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TABLE OF CONTENTS.

EDITORIALS.—Placing Frue Concentrators; Working Blue and White Cement, 145. Passing Events; Duty of a Miner's Inch of Water; The Albion Mine Difficulty; Processes for Silver Ores; Tunnel Locations, 152. Mine Timbering—No. 4, 153. Patents and Inventions; Notices of Recent Patents, 156.

ILLUSTRATIONS.—Arrangement of Shafts and Pulleys for Quarter-Twist Belt; Proper Position for Frue Concentrator with Relation to Battery in Gold Mill, 145. Scale Insects Infesting the Rose, the Juniper and the Euonymus, 150. Timbers for Mines, 153.

MECHANICAL PROGRESS.—“Steel-Iron;” Aid of Machinery to Labor; Forging a Rudder; A Smokeless Locomotive; Paper or Cast-Iron for Car Wheels; The Manufacture of Bessemer Steel, 147.

SCIENTIFIC PROGRESS.—Sweeping the Skies; Man and Animals; Absorption of Hydrogen; How a Man Walks; A New Danger; A Thermostat Current Meter; Jupiter's Spot; Studying Nature, 147.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends and Bullion Shipments, 148.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, New Mexico, Oregon and Utah, 149-9.

THE ENGINEER.—American Steamboats Sweep the World; A Remarkable Record for Safety; Railroad Business; American Railroad System for Japan, 151.

USEFUL INFORMATION.—Spotting of Looking Glasses; Employment of Mules in Coal Mines; The Glucose Business; Cork Shavings for Vinegar; Electrical Glass Cutting; Speed of Cannon Balls; Men to a Mile, 151.

GOOD HEALTH.—The Care of Infants; Blood Diet; Treatment of Heart Disease; Malaria in New England—Suggestive Facts; The Decay of Teeth; General Paralysis, 151.

MISCELLANEOUS.—Wyoming Mines; The Fauna of Arizona; An English Zinc Mine; A Government Asked for Alaska; California Production and Commerce, 149. How to Forestall Frost; Diapirine; Genesis of Metalliferous Veins, 150.

NEWS IN BRIEF.—On page 149 and other pages.

BUSINESS ANNOUNCEMENTS.

Dividend Notice—Bulwer Con. Mining Co., S. F. Iron Shale Riffles—A. B. Paul, San Francisco.

Passing Events.

The lack of rain is causing some uneasiness. There is very little snow in the mountains, and the miners now think they will have a very short water season. It is said there is less snow on the high ranges than was ever known at this season in the history of the State.

It is worthy of note that, in the old Tahle Mountain mines, some very good results have lately been developed. In the old New York claim they have been taking out some gravel worth \$10 a pan, and several of the other claims are doing well. Most of the mines are old ones, worked years ago, and left idle for a long time.

The warm weather of late has been an incentive to prospectors to get ready for their work, as spring will soon be here. It is probable that this season there will be more prospectors on foot than ever before. Idaho, Montana and New Mexico will no doubt be the favorite fields, and there will be some little emigration to Alaska. The mining field on this coast is a very broad one, however, and there is plenty of room for earnest workers.

BRITISH COLUMBIA.—We intend publishing, next week, a double edition of the MINING AND SCIENTIFIC PRESS devoted specially to the interests of British Columbia. We have prepared a fine large map, showing the main geographical features of the region. It also shows the mining regions and the general geology. With this will be a descriptive article by a gentleman who is familiar with British Columbia, and more particularly with its mining territory. The PRESS, in addition, will contain its usual varied contents and numerous illustrations.

Duty of a Miner's Inch of Water.

What percentage of the material removed from hydraulic mines comes down into the valley it is impossible for any one to state with exactness, there not being sufficient data at hand to enable any engineer, no matter how competent, to make an exact estimate. Such data can only be obtained by elaborate surveys.

The best and most accurate method for determining the quantity of solid material discharged at the dump of a hydraulic mine, is to ascertain the “duty” of a miner's inch of water on that particular mine; or in other words, the number of cubic yards that is removed by a miner's inch of water when used consecutively for 24 hours. Testimony elicited in the pending case of Woodruff against the North Bloomfield Mining Co., shows that after a series of very careful experiments and observations made by the most competent persons, at a time long before litigation was commenced, and when there was certainly no object in producing incorrect or exaggerated results, almost certainty has been and can be arrived at by that method.

A “miner's 24-hour inch” of water is 2,230 cubic feet. A careful measurement of the cubic contents of a portion of the mine is made for the purposes of this demonstration, and that portion is washed away; the number of inches of water used and the length of time occupied in the removal of the bank being carefully noted, a simple calculation gives the duty of a miner's 24-hour inch on that bank.

For the purpose of ascertaining the quantity of solid material which is carried by the water to the end of the flume (or dump), we multiply the number of miner's inches by 24 hours, used in the mine, by the duty of each inch, and the product represents the amount of material used. Thus, for instance, at the Bloomfield mine careful measurements, numbering through a series of years, show that now the duty of an inch at that mine is three and one half cubic yards. A stream of 2,800 inches is used per day; here there are 9,800 cubic yards washed into Humbug canyon, each day the mine is at work at its fullest capacity.

To determine the percentage of solid material carried by the water, we multiply three and one half yards by 27, giving 94½ cubic feet; dividing this by 2,230, the number of cubic feet represented by a miner's inch, there results four and one third per cent. of material carried by the water, including not only that held in suspension, but also that rolling along the bottom of the flume.

This shows that the statement of some persons that eight per cent. of solid material passes in suspension from these mines is incorrect. To carry eight per cent. of sediment, both in suspension and rolling along the bottom of the flume, according to the rule stated, the correctness of which cannot be successfully disputed, it would require from the mines referred to nearly seven cubic yards per 24-hours' inch. Observations show that at the Excelsior mine the duty of a miner's 24-hours' inch does not exceed two cubic yards, which gives about two and one quarter per cent. carried by the water to the dump. At the Milton mine the duty is two and four tenths cubic yards, or about three per cent. carried to the dump. At the North Bloomfield mine the duty is three and one half cubic yards, or about four and one third per cent. discharged from the flume.

The Albion Mine Difficulty.

Our Eureka correspondent, Mr. Joseph, sends us the following note in the matter of the Albion mine, under date of February 26th: “No such failure in the management of a promising, and no doubt valuable mine, has ever been recorded in Eureka district as that of the Albion. During the long course of litigation that followed the first discovery of an ore body in the mine, the sympathies of the people of Eureka were with the Albion Co., for the reason that they desired to have three large companies operating in the district in place of only two. To-day the same people are almost unanimous in the wish that the Richmond Co. had won every suit and held every inch of ground for which they fought. During the past week attachments have been levied amounting to \$75,000, and liens have been filed for about \$15,000. It is estimated that \$20,000 additional will cover the amount of the company's indebtedness in Eureka. I learn that \$110,000 will cover the amount of the San Francisco indebtedness.

The total indebtedness of the company is variously estimated from \$220,000 to \$320,000. No one however knows positively but inside parties. While several of the miners have filed liens, there are some who will not, they expressing belief that the mine will come out all right. There is a difference of opinion as to the mine, some of the miners freely stating that it looks better to-day than it ever did, and others to the contrary. Mr. Williams, the foreman, says that ore has been struck on the main (335 foot) level, in the Uncle Sam crosscut. This result of this reckless management is a severe blow to our camp, and what the outcome will be, it is impossible to foresee.

Processes for Silver Ores.

The great variety of processes still employed for the extraction of silver in different parts of the world, and each one possessing advantages over the others for the treatment of the ores of particular localities, are rendered necessary by the great diversity existing in the associates of the metal, the very large amount of materials that it is necessary to operate upon, owing to the argentiferous minerals often occurring minutely disseminated through large proportions of an earthy gangue, more or less intimately mixed with ores or compounds of other metals, as galena, copper ores, etc. The methods employed for the separation of metallic silver from its ores, or metallurgical products, in which it exists in notable quantity, may, however, be classed under three heads. The different methods of amalgamation employed, based upon the solubility of metallic silver in mercury, and the subsequent ready expulsion of the latter on the application of heat to the amalgam include:

1. The Mexican methods of amalgamation in heaps.
2. The European system of amalgamation in casks, known also as the “barrel process.”
3. The methods of amalgamation in kettles or pans.

There are various wet methods for the extraction of silver from its sulphides by first converting them into chloride or sulphate, which is then dissolved out by water, solution of common salt, or other suitable solvent, and the silver subsequently deposited by precipitation from the solution so obtained, these methods including—

1. “Angustin's” method, by which the ore, or cuprous regulus, is converted into argentic chloride, which is then extracted by a solution of sodic chloride, and the silver afterwards precipitated by metallic copper.
2. The method of “Ziervogel” for the conversion of argentic sulphide into sulphate, which is subsequently dissolved out by hot water, and the silver precipitated as cement silver, as in the Angustin process.
3. The method of “Von Paterna,” by which the argentic sulphide is converted into chloride, which is then dissolved out by a solution of sodic hyposulphite, from which the silver is reprecipitated as argentic sulphide freed from other metals, the sulphide being then reduced by the application of heat.

Then there are the methods in which the silver is concentrated in a quantity of lead, from which it is subsequently separated by the process of cupellation. The silver is argentiferous copper matte, or other regulus, which was formerly separated by amalgamation methods, etc., is frequently separated by these methods, and very rich silver ores are also treated by these methods; while, in fact, all silver ores may be treated by fusion with galena or other lead-yielding product, with the separation perhaps of a larger portion of silver than is effected by the amalgamation processes; but owing to the scarcity of fuel in certain localities, and the expense, this method cannot be applied, and the methods of amalgamation are there accordingly more convenient and economical.

ALTHOUGH they are unable at present to get their ores reduced, on account of the freezing up of the water mills, the miners down about Silver City are still hard at work in their mines. It is said that work is being done on not less than 30 little mines down in that neighborhood, from all of which more or less paying ore is being taken out.

The Lake Superior (Mich.) iron mines produced 2,943,300 tons of ore in 1882, valued at \$24,237,200. The iron product of Michigan is of more value than the silver product of any State in the Union.

Tunnel Locations.

Miners generally do not seem to understand as clearly as they should the provisions of the laws regarding tunnel location, either as to the rights of the locators themselves or those discovering or owning claims near the line. We will endeavor in this article to point out such facts as prospectors and miners should remember in this connection.

It has always been the policy of the Government—as shown by the statutes providing for the disposal of the public lands containing minerals—to prevent an individual or company from acquiring title to large tracts of mineral land. Because, therefore, men start a tunnel into a hill, it does not give them the right to the hill or to a tract 3,000 feet long and 1,500 feet wide, as many persons erroneously suppose to be the case. This would be a hundred acres or so, and there is no authority for locations of this size, either in any local law or Congressional enactments.

Section 2,323 of the Revised Statutes provides that where a tunnel is run for the development of a vein or lode, or for the discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes within 3,000 feet from the face of such tunnel on the line thereof not previously known to exist, discovered in such tunnel, to the same extent as if discovered from the surface, and locations on the line of this tunnel, of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, are invalid; but failure to prosecute the work on the tunnel for six months is considered an abandonment of the right to all undiscovered veins or lodes on the line of the tunnel. This is not an abandonment of ledges found.

The effect of this is simply to give the proprietors of a mining tunnel, run in good faith, the possessory right to 1,500 feet of any blind lode cut, discovered or intersected by such tunnel, which were not previously known to exist, within 3,000 feet from the point of commencement of the tunnel, and to prohibit other parties, after the commencement of the tunnel, from prospecting for and making locations of lodes on the line thereof, and within the distance of 3,000 feet, unless the lodes appear on the surface as were previously known to exist.

The term “face” is construed to mean the first working face formed on the tunnel, and to signify the point at which the tunnel actually enters cover; it being from this point that the 3,000 feet are to be counted, upon which outside prospecting is prohibited.

To avail themselves of the benefits of this provision of law, the proprietors of the tunnel have to give notice of the location, and carefully mark lines and boundaries, the actual or proposed course or direction of the tunnel, height and width thereof, etc. The Land Office takes particular care that no improper advantage is taken of this provision of law, by people who make locations to attempt to monopolize the lands lying in front of their tunnels, to the detriment of the mining interests and exclusion of bona fide prospectors.

We have italicized the words in the law speaking of the line of the tunnel; because the line of the tunnel is held to be the width thereof and no more, and upon this line only is prospecting for blind lodes prohibited while the tunnel is in progress. The width of the location is restricted to the actual width of the tunnel now. For instance, if a tunnel is six feet wide, the location covers 3,000 feet long and six feet wide. On either side of this any one may prospect and take up such claims as he may find.

Stakes or monuments are to be placed along the line of the tunnel to mark its course and position. The tunnel is a means of discovery. When a lode is discovered, the tunnel proprietor must proceed in locating his surface ground, staking it off, posting notice, recording, etc., as if the mine was discovered from the surface.

Upon a line represented by the width of the tunnel, prospecting for blind lodes is prohibited while the working of the tunnel is in progress; and the right is granted to the tunnel owner to 1,500 feet of each blind lode not previously known to exist, which may be discovered in the tunnel; but other parties are no way debarred

from prospecting for blind lodes or running tunnels so long as they keep without the line of the tunnel; the said line being required by regulation to be marked on the surface by stakes or monuments. When a lode is struck by running a tunnel, the owners have the option of recording their claim of 1,500 feet all on one side of the point of discovery, or partly on one side and partly on the other; but in no case can they so record a claim as to absorb the actual or constructive claim or possession of other parties on a lode which has been discovered and claimed outside the line of the tunnel, before the discovery thereof in the tunnel.

Locators of tunnel rights are expected to use reasonable diligence in working and advancing their tunnel. There is no specified amount to be expended to retain the ownership of tunnels; but the law provides that if no work is done in six months it is a virtual abandonment of the right to all undiscovered veins on the line of the tunnel.

It has been decided that no patents can issue for a vein or lode without surface ground. Therefore it is held that the survey of a vein or lode discovered in a tunnel, can not properly be made until the apex thereof has been ascertained by sinking a shaft or by following it upon its dip from the point of discovery.

There is no provision of law for patenting tunnel locations. Such lodes, however, as are discovered in running the tunnel may be patented in the usual way.

The Act of February 11, 1875, credits to a lode claim the expenditures made in running a tunnel for the purpose of developing the lode owned by the proprietors of the tunnel. No surface work will then have to be done to hold the claim.

The right of possession of veins or lodes granted by Act of Congress to tunnel owners, is dependent, among other things, upon discovery of the vein or lode in the tunnel. The effect of the Act is to give a party running a tunnel for any purpose, whether for prospecting or development, the right to pre-empt and locate any and all lodes not previously known to exist, discovered in such tunnel, to the same extent as if discovered from the surface.

If, by local custom, the owner of one mining claim has a right to construct a tunnel through an adjoining claim, in order to enable him to work his own claim, a Court of Equity may enjoin any interference with that right.

An expenditure of more than \$1,500 by the owners of an adjoining claim on the portion of a tunnel running through the premises embraced in an application for patent, in case the applicants were to have an interest in such tunnel, is considered an expenditure, under the mining law, upon the claim applied for.

Where a lode had been discovered and located on the surface, and it remained in doubt whether it was the same lode which had been entered by a tunnel below, and the said tunnel was prosecuted for blind lodes, as well as for the lode discovered on the surface, a Nevada Court has held that not only could the *habendum* of a deed which was uncertain as to its conveyance of the ledge be used to explain or qualify the description of the granting clause, but that parol evidence was admissible to show the circumstances under which the deed was made, to reach the intent of the parties as to the ledge.

It will be seen that where there has been a total abandonment of, or a failure to prosecute work on a tunnel for six months, the party or parties claiming the tunnel forfeit the right to the undiscovered veins on the line. Should either of the parties claiming the tunnel refuse or fail to contribute his proportion of the expenditures required by Section 2324 upon a lode owned by them, or in running a tunnel for the purpose of developing a particular lode or lodes owned by them, the co-owners who have made the required expenditure may proceed against the delinquents in the ordinary manner prescribed for lode claims. This is an important point for miners to remember.

As we have before stated, a tunnel site under the law cannot exceed in length 3,000 feet, and the width is the actual width of the tunnel itself. The Commissioner of the Land Office has decided that a tunnel owner would have the right to the timber growing upon this tract, so long as he complies with the law in running the tunnel.

It was decided in a Nevada court, in the case of Bullion M. Co. vs. the Croesus M. Co., that "when a suit is brought for a blind ledge,

bounded by walls found at a depth of 200 feet below the surface, the ledge only, and no part of the surface can be recovered.

We append the form of a location certificate for a tunnel claim:

Know all men by these presents, that the undersigned, citizens of the United States, have this _____ day of _____ 188____, claimed by right of location, a tunnel claim, for the purpose of discovering and working veins, lodes or deposits on the line thereof [cutting the _____ lode, and working the _____ lode.] Said tunnel claim is situated in the _____ mining district, county of _____, State of _____, and the location and bounds of said tunnel are staked on the surface at the place of commencement and termination thereof. Said claim is more particularly described as follows: [Describe the commencement and termination by reference to natural objects and permanent monuments, and the line by courses and distances.] Dated _____, 188____, _____, Locator.

These facts, which we have taken some little trouble to compile from the U. S. Revised Statutes, decisions of the courts, decisions of Secretary of the Interior and rulings of the U.

Mine Timbering—No. 4.

Timbering of Shafts.

As practiced on the Comstock, and generally on the coast, the shaft timbering consists of framed sets or cribs of square timber, placed horizontally, four feet apart, and separated by uprights or posts introduced between them. Each horizontal set of timbers, therefore, marks about five feet in depth. Cross-timbers for the partitions between the compartments form a part of every set. The whole is covered on the outside by a lagging of three-inch plank placed vertically. This method of timbering is illustrated by several drawings on this page. Fig. 1 represents the plan of the shaft, or of one horizontal set of timbers; *S. S.* are the longitudinal or sill timbers; *T. T.*, the transverse end timbers; *P.*, partition timbers; *R.*, guide rods, between which the cage moves; *G.*, gains cut in the sill timbers to receive the ends of the posts. The sheathing or lagging is seen inclosing the whole frame.

Fig. 2 is a transverse section through the par-

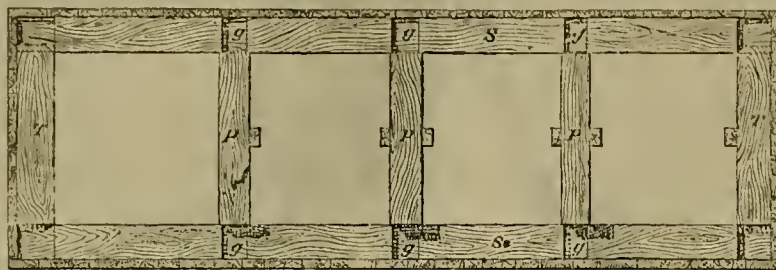


FIG. 1.—PLAN OF A FOUR COMPARTMENT SHAFT.

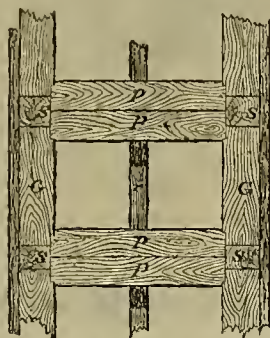


Fig. 2.—Transverse Section Through Partition.

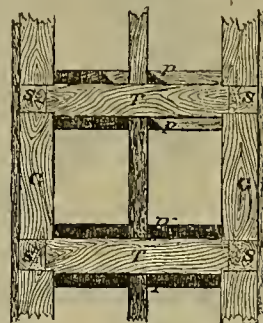


Fig. 3.—End View of Frame.

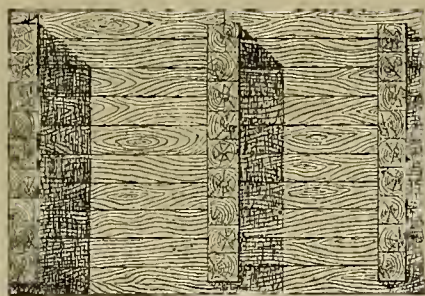


Fig. 4.—Longitudinal Section of Shaft.



Fig. 5.—End View of Shaft.

S. Land Office, are worthy of preservation in this condensed form, and miners will do well to cut the article out and put it away for reference.

MANGANESE AS FLUX.—The Tombstone company's smelter at Charleston has again shut down. It is said that it will start up again about the 1st of March. We fear that it will have to be admitted that manganese as a flux, other than in limited quantities, will have to be pronounced a failure. There seems to be no substitute for lead in smelting dry ores, and the Tombstone company's tailings are too poor in lead to make the smelting a success, except more lead can be got to work with them.—*Tombstone Republican*.

THE original Benson smelter has been torn down, and a Pacific coast furnace has been put up in its place. This shows that there is no money in putting up a square barn of a concern, where cold corners are always causing the furnace to freeze up.—*Tombstone Republican*.

THE Bodie Miner says that Sweetwater is supposed by many to be a better camp to bet on for permanency than Cory.

THE engineer, who hoisted to the surface the last lot of men that came out of the Yellow Jacket disaster on the Comstock, was Frank Kellogg, who died recently in Mason valley.

THE Deadwood-Terra mine passed the dividend this month for the first time since the consolidation of these claims.

tion *P.* of Fig. 1, between the pumping compartment and the adjoining hoisting compartment, looking toward the latter. In this figure, *G.*, *G.* are the posts; *S.*, the sill timbers; *P.*, the partition timbers, the ends of which are framed with short tenons that are received in gains cut in the sill timbers and the ends of the posts; *r.*, guide rod; *l.*, lagging or sheathing.

Fig. 3 is an end view of the frame shown in Fig. 1. The single piece, *T.* forms the ends, while the double pieces, *P.* forming the partitions, are seen beyond. The other letters denote the same parts as in Fig. 2.

The outer timbers of each set, that is, the two sides and ends of the main frame, are 14 inches square. The posts, 10 in number, four at the corners and two at each end of the three partitions, are of the same size. The dividing timbers forming the partitions are 12 inches square. These partitions, as may be seen in the drawing, are not close, no planking or lining being used on them, but two pieces of timber are employed, one above the other, at each set, leaving open spaces of about three feet between the sets.

The ground through which these shafts pass being generally too unsettled to allow of sinking to any considerable depth without support, the work of timbering is necessarily done from above downward, as the sinking progresses.

The method of putting these timbers in place is about as follows:

When sufficient ground has been excavated below the last set of timbers, for conveniently putting in another lower set, the long horizontal timbers, or sill-pieces, forming the sides of the set already framed for receiving the ends, and having gains cut for the posts and cross-pieces, or ties, are lowered down and put approximately in place; being hung by chains to the last set already fixed above. The sill pieces are usually in two parts, each about 13 feet long, batted together at the middle, without splice or framing. The ends, cross-pieces and posts are then fitted as nearly as possible into their proper places. This being done, several long, round iron bolts, each made in two parts with a tightening screw in the middle, are passed through the new set and the one, or sometimes two or more, above. Everything being approximately in its place, the new set is adjusted exactly to its proper position, by means of the tightening screws on the bolts by which it now hangs to the set above. The lagging is then put in behind the timbers, and between the plank and the ground are inserted pieces of spiling and wedge-timber, which are driven into place or forced in by jackscrews as firmly as possible. Once fixed in this manner, everything is held by lateral pressure; the bolts by which the set was at first suspended are allowed to remain for a time and then withdrawn, for use in placing succeeding sets.

The shafts on the Comstock timbered in this manner generally stand very well and are maintained in good condition. When movements of ground force any part of the work out of line, the disturbed sets may be taken out and replaced by new, or readjusted without difficulty; and, unless the ground is very bad, with a tendency to move in large masses, the perpendicular line of the shaft may be well preserved.

When it becomes necessary to retimber a shaft or any considerable part of it, the work is usually carried on in one compartment or one half of the shaft, while the remaining compartments are kept for use in the ordinary operations of the mine.

Nearly all the deep shafts of the Comstock mines have required more or less retimbering. This has been especially the case in the deeper portions, near the vein, where the ground passed through is sometimes very heavy, consisting of massive clay which exerts a tremendous pressure on the timbers. To withstand this latter it is sometimes necessary to resort to methods still more substantial than that just described. In uncommonly heavy ground a shaft is timbered with double sets, and outer set inclosing the ordinary single set, giving additional strength to the frame. In the bad ground very large expense is involved for the proper maintenance of the work. Some of the retimbering is done with 14-inch timbers, placed in sets not four feet apart, as just described, but close together, making a solid casing 14 inches thick. In some shafts the sill pieces are made in two parts of unequal length, one long and one short piece, and in each succeeding set these pieces are so placed as to break joints, the joint running opposite one or the other of the timber partitions between the compartments. The corners of the frame are joined together simply with a nitred joint (as shown in Fig. 1); and the end pieces are placed transversely between them, in such a manner that the end of each transverse piece bears with half its thickness against two adjacent sill pieces.

Figs. 4 and 5 illustrate this method of construction. Fig. 4 is a longitudinal section of a portion of the shaft, showing one end and two partitions. The sill timbers are laid close together, one upon another; the end timbers are placed in a similar manner, but breaking joints with the sill timbers, as shown in Fig. 5, which is an end view of the shaft. The partition timbers are placed like the end timbers, one upon another, but their ends are not let into the sill timbers by any gain or mortice; the sills are dressed smoothly to receive the ends of the partition timbers, which are then put in place without any framing.

The cost of making these shafts is not very readily ascertained, because, in most cases, the expense of making the shaft is involved in the accounts with other general expenses of the mine, so that an accurate and minute analysis is almost impossible. One shaft, cited by Mr. Hague, at a depth of 1,129 feet, had cost \$180 per foot. Deeper shafts cost more in proportion.

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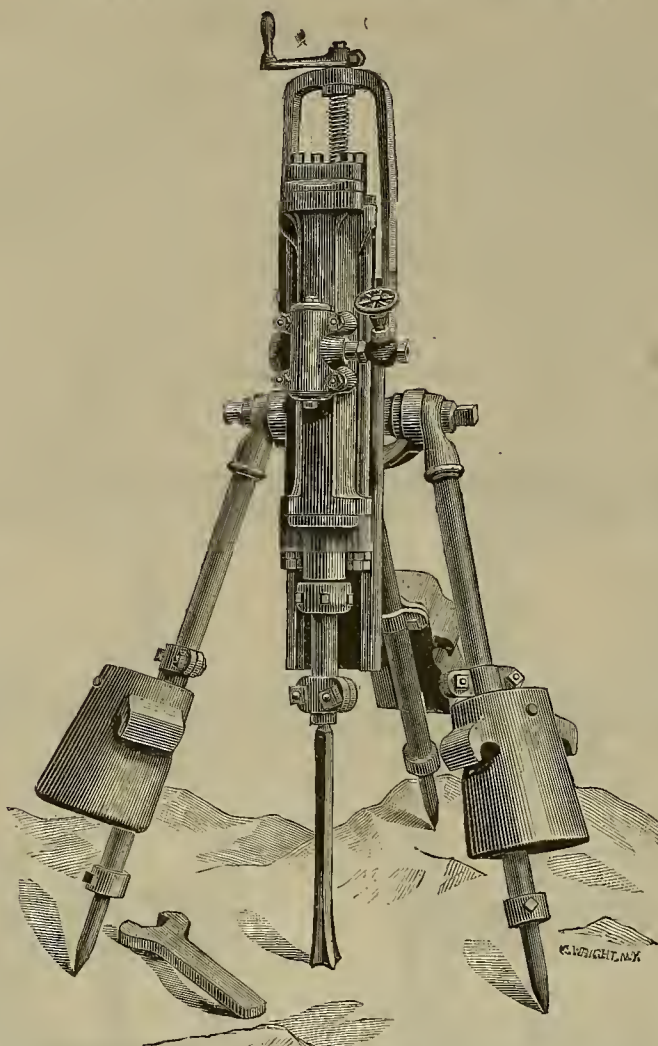
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California Inventors

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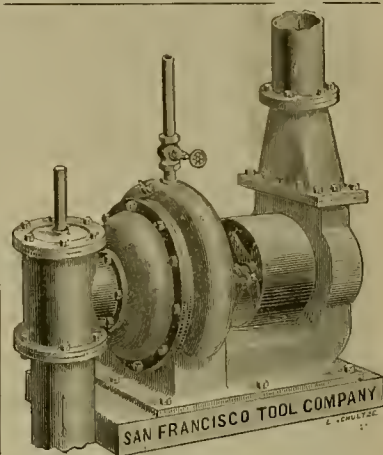
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

WEEK ENDING FEBRUARY 13, 1883.

272,112.—ROTARY HARROW.—Jas R Bane, Gilroy, Cal.
 272,197.—BUCKLE.—Geo. W. Blake, Port Townsend, W. T.
 272,116.—ATMOSPHERIC BED.—E. Blochman and Geo. R. Evans, S. F.
 272,117.—CAMERA SHUTTER.—D. L. Boydson, Volcano, Cal.
 272,252.—MANUFACTURE OF CANDY.—C. W. Hellenbrand, Salem, Oregon.
 272,046.—SEEDER AND CULTIVATOR.—J. E. Henris, Collegeville, Cal.
 272,376.—CAR COUPLING.—John L. Look, Yuba City, Cal.
 272,296.—CONSTRUCTION OF JAILS.—Samuel M. McLean, Modesto, Cal.
 272,177.—CAR BRAKE.—E. T. Stone, Spanish Hollow, Oregon.
 272,171.—BUNTLINE FOR REEFING SAILS.—Ira A. Storer, S. F.
 272,175.—TRACE HOOK.—C. P. Wakefield, Cressey, Cal.
 272,177.—TWO WHEELED VEHICLE.—Benj. P. Whitney, Potter Valley, Cal.
 272,178.—GRAIN SEPARATOR.—Martin Wilcox, Paskenta, Cal.

WEEK ENDING FEB. 20, 1883.

272,509.—ORE CONCENTRATOR.—J. M. Adams and W. F. Carter, S. F.
 272,530.—DEVICE FOR DRESSING SAW TEETH.—S. H. Chase, San Jose, Cal.
 272,653.—PRODUCING COOL ATMOSPHERE IN ROOMS, ETC.—H. D. Cogswell, S. F.
 272,654.—DISTRIBUTING REFRIGERATED AIR AND WATER.—H. D. Cogswell, S. F.
 272,549.—FRUIT STONER.—Louis C. Hill, Myrtle Creek, Oregon.
 272,557.—TWO WHEELED VEHICLE.—Geo. P. Kimball, S. F.
 272,564.—AMALGAMATOR.—S. G. Lindsey, Salt Lake City, Utah Ter.
 272,725.—ENVELOPE.—David Lubin, Sacramento, Cal.
 272,058.—TRESS BRIDGE.—D. B. Matlock, Millville, Cal.
 272,582.—GAS PURIFYING SCREEN.—E. M. Provancher, Vallejo, Cal.
 272,592.—WATER WHEEL BUCKET.—Charles D. Smith, Amador, Cal.
 272,599.—ASSAY FURNACE.—J. C. Tappeiner, Bisbee, Arizona Ter.
 272,607.—PISTON WATER METER.—Frank Walker, Tombstone, Arizona Ter.
 272,815.—TWO WHEELED VEHICLE.—E. Whitmore, S. F.
 272,635.—LOCOMOTIVE.—A. E. and H. Blackman, Snohomish, W. T.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through DEWEY & CO.'S SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

BUNTLINE FOR REEFING SAILS.—Ira A. Storer, S. F. Dated Feb. 13, 1883. No. 272,171. This invention relates to certain improvements in sails and their running gear; and it consists in the addition of certain lines which the inventor calls "purchase buntlines" whereby a portion of the sail may be hauled up to render the clewing up for the remainder an easier matter; and in certain strengthening ropes upon the forward part of the sail. When a sail is very large, as in a top-gallant sail, for instance, great difficulty is found in clewing them up. This has led to the placing on large vessels of two yards—the upper and lower top-gallant yard—and of bending on each a top-gallant-sail-upper and lower. These sails are each worked by its own set of running gear and the advantage obtained is in dividing a large sail into two smaller ones, each of which is comparatively easy to be handled. But the obvious objections to the plan are, that a sail is more effective as a single sail than when the same amount of canvas is made into two sails; that there is too much weight aloft; that it requires too much gear; and that two yards and gearing are more expensive than one. The object of Mr. Storer's invention is to retain the single large sail, and, by a proper arrangement of additional running gear, avoid the difficulty of clewing up, and also by a proper strengthening of the sail to economize in the character of the canvas and still have the sail as strong as before.

ROTARY HARROW.—James R. Bane, of Gilroy, California. No. 272,112. Dated Feb. 13, 1883. This invention relates to certain new and useful improvements in rotary harrows, and more especially to that class in which concentric rings are made to revolve in opposite directions. The improvements consist in the means by which the opposite rotation is effected, and in a means for supporting the harrow rings to limit the depth to which the teeth may penetrate, and to prevent friction. The object of this invention is to provide an effective and simple harrow.

GRAIN SEPARATOR.—Martin Wilcox, of Paskenta, California. No. 272,178. Dated Feb. 13, 1883. This invention relates to improved means for separating wheat from barley, oats, and small grains or seeds, after the grain has been cleaned from the straw and chaff.

In countries where malaria is prevalent, or where the climate is subject to sudden changes—should be found in every house Brown's Iron Bitters.

Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending Feb. 27, 1883.									
HIGHEST AND LOWEST BAROMETER.									
Feb. 21	Feb. 22	Feb. 23	Feb. 24	Feb. 25	Feb. 26	Feb. 27			
30.128	30.12	30.056	30.160	30.224	30.227	30.125			
29.997	30.035	29.996	30.056	30.160	30.182	30.125			
MAXIMUM AND MINIMUM THERMOMETER.									
55	55	55.5	53	66.5	70	70.5			
49	49	43.5	48	48.5	52	51.5			
MEAN DAILY HUMIDITY.									
86.3	87.3	84.0	83.3	70.0	63.3	65.3			
PREVAILING WIND.									
W	SW	S	W	NW	NW	N			
WIND—MILES TRAVELED.									
253	221	173	181	112	112	116			
STATE OF WEATHER.									
Fair.	Cloudy	Cloudy	Fair.	Fair	Fair	Clear.			
RAINFALL IN TWENTY-FOUR HOURS.									
.00	.00	.00	.00	.00	.00	.00			
Total rain during the season from July 1, 1882, 12.07 inches.									

ESTHETICISM appears to be dying out in England. The exchange column of the ladies' newspapers have many offers of art embroidery of sunflowers and lilies on sagegreen cloth, and Oscar Wilde's return has evidently excited no enthusiasm.

THE membership of London clubs aggregates nearly 100,000. Their property is worth something over \$25,000,000. There are clubs exclusively for clergymen, and others whose members devote their meetings only to high gambling.

Failing!

That is what a great many people are doing. They don't know just what is the matter, but they have a combination of pains and aches, and each month they grow worse.

The only sure remedy yet found is BROWN'S IRON BITTERS, and this by rapid and thorough assimilation with the blood purifies and enriches it, and rich, strong blood flowing to every part of the system repairs the wasted tissues, drives out disease and gives health and strength.

This is why BROWN'S IRON BITTERS will cure kidney and liver diseases, consumption, rheumatism, neuralgia, dyspepsia, malaria, intermittent fevers, &c.

Mr. Simon Blanchard, a well-known citizen of Hayesville, Meade county, Kentucky, says: "My wife had been sick for a long time, and her constitution was all broken down and she was unable to work. She was advised to use Brown's Iron Bitters, and found it to work like a charm. We would not now be without it for any consideration, as we consider it the best tonic in the world."

BROWN'S IRON BITTERS is not a drink and does not contain whiskey. It is the only preparation of Iron that causes no injurious effects. Get the genuine. Don't be imposed on with imitations.

IRON SLUICE RIFLE.

I have an Iron Rifle, adapted for Hydraulic, Drift and Quartz sluices, which is proving very efficient, below everything else. (Cost six cents per pound.) Address, ALMARIN B. PAUL, Room 20, Safe Deposit Building, San Francisco. The following speaks for itself: INDIAN SPRING DRIFT MINE, Feb. 24, 1883. Mr. A. B. Paul:—I have tried your Rifles thoroughly, and find them a fine Rifle. They are good with quicksilver or without. They gather the fine gold and rusty gold. I find gold that will not touch quicksilver stops in them, and which glide over 300 feet of sluice above them. I shall try 30 more, and if they save the same amount of gold in four weeks' run, I shall want 100 more. I am not afraid to vouch for them. B. G. McCLAIN, Superintendent Indian Spring Drift Mine.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Feb. 23, 1883.

ANTIMONY.—			
Per pound.....	—	@	15
IRON.—			
American Pig, soft, ton.....	—	@	231 00
Scotch Pig, ton.....	—	@	229 00
American White Pig, ton.....	—	@	—
Oregon Pig, ton.....	—	@	230 00
Clipper Cap, Nos. 1 to 4.....	—	@	—
Refined Bar.....	—	@	—
Horse Shoes, keg.....	—	@	5 50
Nail Rod.....	—	@	70
Norway, according to thickness.....	—	@	7 70
STEEL.—			
English Cast, lb.....	16	@	25
Black Diamond, ordinary sizes.....	—	@	14
Drill.....	15	@	16
Machinery.....	12	@	14
COPPER.—			
Ingot.....	—	@	22
Sheet.....	37	@	31
Sheathing, Tinned 14x18.....	—	@	31
Nails.....	—	@	33
Boil.....	—	@	3
Old.....	—	@	8
Bar.....	—	@	—
Cement, 100 fine.....	—	@	15 1/2
LEAD.—			
Pig.....	42	@	54
Bar.....	—	@	6
Pipe.....	—	@	8
Sheet.....	—	@	9
Shot, discount 10% on 500 Bags.....	—	@	2 10
Drop, per bag.....	—	@	2 30
Pick.....	—	@	2 30
Chilled.....	—	@	2 50
TIN PLATES.—			
Charcoal.....	7 25	@	7 50
Coke.....	6 25	@	6 40
Banca Tin.....	—	@	25 10
Australian.....	—	@	25 00
I. C. Charcoal Roofing 14x20.....	—	@	6 90
ZINC.—			
By the Cask.....	—	@	9
Zinc, sheet 7x3 ft., 7 to 10 lb, less the cask.....	—	@	10
NAILS.—			
Assorted Sizes.....	4 00	@	4 75
QUICKSILVER.—			
By the flask.....	—	@	37 1/2
Flasks, new.....	—	@	1 25
Flasks, old.....	—	@	1 05

Successful Patent Solicitors.

As DEWEY & CO. have been in the patent soliciting business on this coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That is this understood and appreciated is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

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OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

O. W. McCREW—Santa Clara county.
 M. P. OWEN—Santa Cruz county.
 J. W. A. WRIGHT—Merced, Tulare and Kern counties.
 JAMES C. HOAG—California.
 B. W. CROWHILL—Los Angeles and San Bernardino counties.
 L. WALKER—Sacramento, San Joaquin and Stanislaus counties.
 N. H. HAPGOOD—Plumas county.
 A. C. KNOX—Santa Clara county.
 M. H. JOERFUS—Eureka, Nev.
 GEORGE McDOWELL—Sonoma and Mendocino counties.

A Cheerful Recommendation.

BENTON, CAL., February 4, 1883.

Messrs. DEWEY & CO., Patent Solicitors:—I am in receipt of my patent, "Improvements in Vehicle Brake," obtained through your Agency, and would say I am much pleased with thorough and graphic description in specifications and drawings, and can cheerfully recommend you to anyone wishing to obtain favors in your line.—Truly yours, G. R. DUVAL.

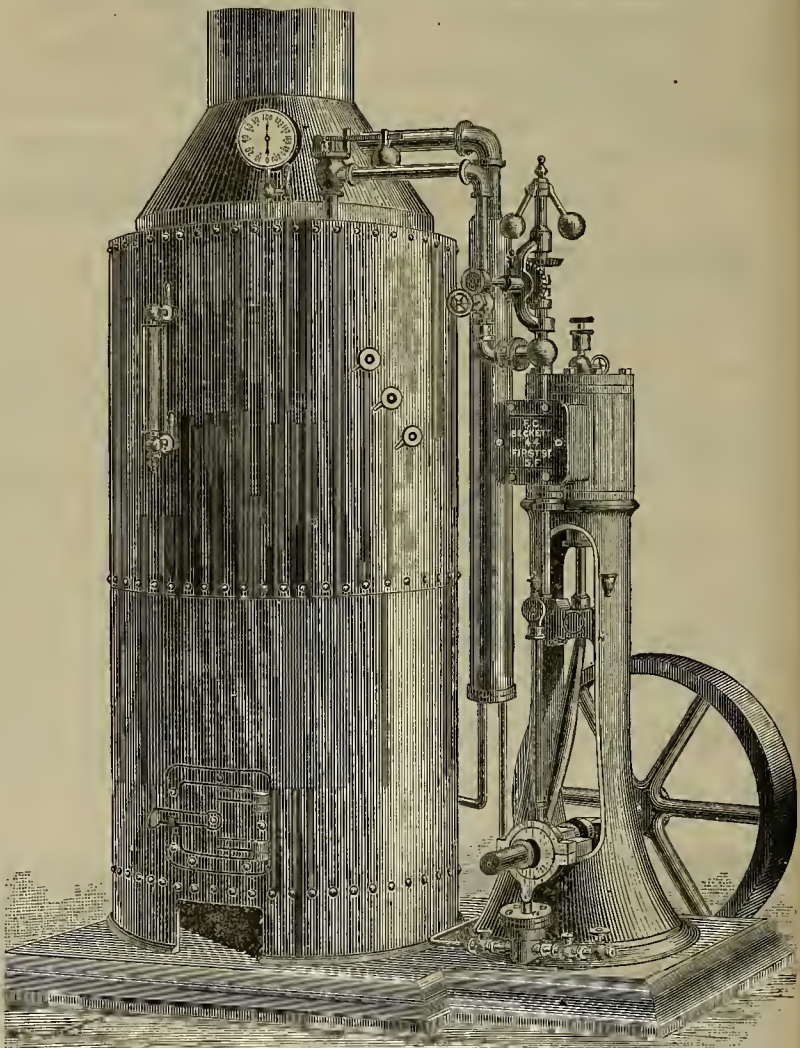
CHEAP ORE PULVERIZER.—There is for sale in this city, as will be seen by our advertising columns, a second-hand Rutherford Pulverizer, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it.

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Should this paper be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent.

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Our terms are cash in advance for this paper. NEW NAMES will not be entered on our printed list until payment is made. Feb. 1, 1883.



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VERTICAL AND HORIZONTAL ENGINES AND BOILERS, FROM 2 TO 90-HORSE POWER.

Improved Hoisting Engines, Engines for steam Yachts. Engines for pumping artesian wells and irrigating and arming purposes, and all kinds of Machinery.

Repairing Promptly Attended to.

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"THE \$1,000 CHALLENGE"

Ore Feeder for Quartz Mills.

OVER 800 ARE NOW IN USE, GIVING ENTIRE SATISFACTION.

Awarded First Premium at the Tenth and Twelfth Industrial Fairs of the Mechanics' Institute.

Twenty Per Cent. More Ore Crushed with Fifteen Per Cent. Less Wear of Iron than by and Feeding.

The accompanying cut illustrates the recently introduced
Ore Feeder, and also the Spring Attachment, which replaces the
Weight heretofore used, and which are obvious improve-
ments.

It is now fully demonstrated, after careful and long con-
tinued experimentation and practical use, that the plan
upon which a perfect Ore Feeder must be constructed is that
of a carrier, and not that of a shaking table. Uniform and
accurate feeding is not possible upon the latter plan. The
ore must be evenly carried, upon a steadily advancing plane
or table, to the line of discharge, and there simply dropped
jerky or spasmodic contrivances will not answer the purpose
for wet or sticky ores.

The Challenge Ore Feeders are now in Use in
the following Mills, besides many others

Soulsby.....	20 Stamp.....	Tuolumne county, Cal.
Sheep-Ranch.....	20 ".....	Calaveras " "
Mahoney.....	40 ".....	Anador " "
Zelle.....	40 ".....	" " " "
Placerville.....	40 ".....	El Dorado " "
Gross.....	50 ".....	" " " "
Julian.....	50 ".....	Placer " "
St. Patrick.....	15 ".....	" " " "
Providence.....	20 ".....	Nevada " "
Onuma.....	10 ".....	" " " "
Green Mountain.....	60 ".....	Plumas " "
Plumas-Eureka.....	60 ".....	" " " "
Hulwer-Standard.....	30 ".....	Bodie Dis., Mono, "
Standard.....	20 ".....	" " " "
Noonday.....	30 ".....	" " " "
Bodie.....	10 ".....	" " " "
Christy.....	5 ".....	Utah Co., Utah
Ontario.....	40 ".....	Barley's Park " "
Contention.....	24 ".....	Tombstone Dis., Arizona
Grand Central.....	20 ".....	" " " "
Harshaw.....	20 ".....	Patagonia " "
Sausalito.....	20 ".....	Idaho Springs, Col.
Homestead.....	200 ".....	Black Hills, Dakota.
Father De Smet.....	84 ".....	" " " "
Hidden Treasure.....	40 ".....	" " " "

Superiority of the "Challenge" Ore Feeder Demonstrated!

At the "Christy" Mill, Utah County, Utah, the
"Eclipse" Feeders, (conceived by E. Coleman) were intro-
duced, but not carrying a regular supply of ore for the crush-
ing capacity of the stamps, were replaced by the "Challenge"
which are now running and the stamps crushing forty (40)
per cent. more than was done by the "Eclipse".

The "Harshaw" or "Hermosa" Mill, of Patagonia Dis-
trict, Arizona, was also originally fitted with "Eclipse"
Feeders, but after a few weeks' trial they were pronounced
inadequate to the work, discarded, and the "Challenge"
adopted.

The "Silver King" Mill of Arizona, also removed the
"Eclipse" Feeders to give place to the "Challenge".

The "Sola" Mill, of Brown's Valley, Yuba County, Cal.,
was fitted with "Victor" Feeders, manufactured by E. T.
Steen, but proving insufficient, the "Challenge" Feeders were
substituted.

Four of the "Victor" Feeders, manufactured by E. T.
Steen, were also placed in the "Alexander" Mill, at Grants-
ville, Nevada, but after a fair trial were discarded, and Hen-
dy's Feeders fitted, and four others of the same pattern ad-
ded when the second twenty stamps were erected.

These cases are simply cited from among many similar instances, in proof of the vast superiority of the "Challenge" Feeders over all others.

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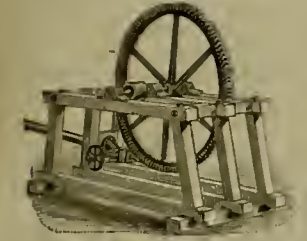
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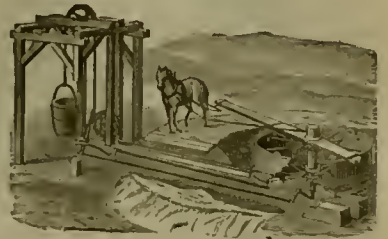
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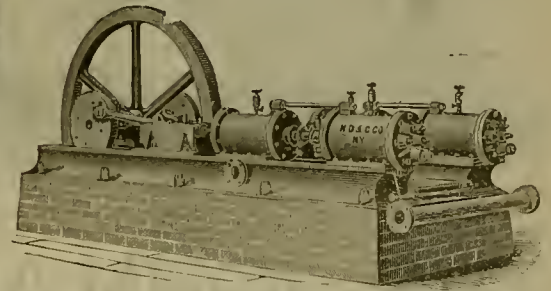
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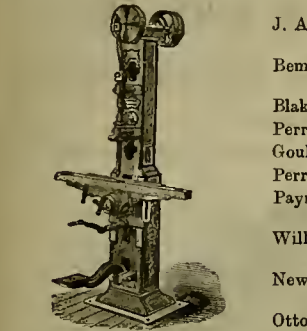
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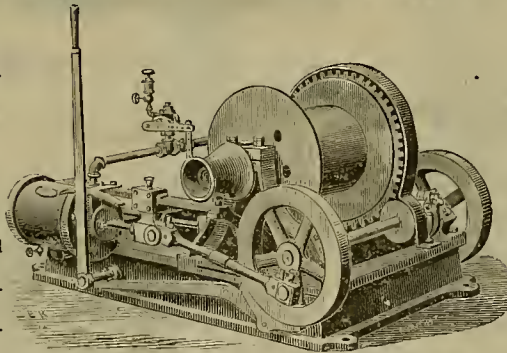


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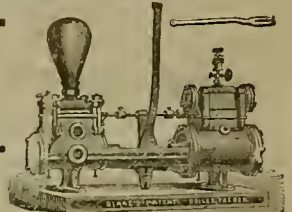
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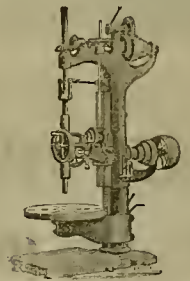
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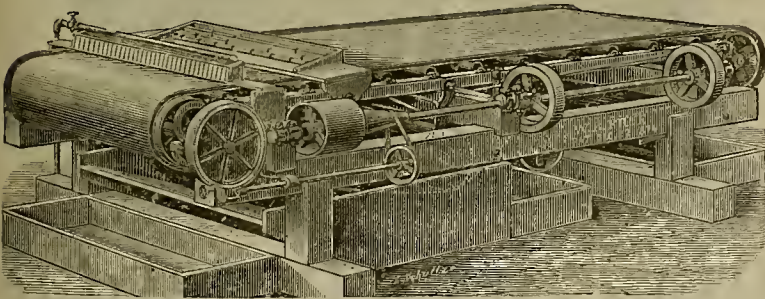
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That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

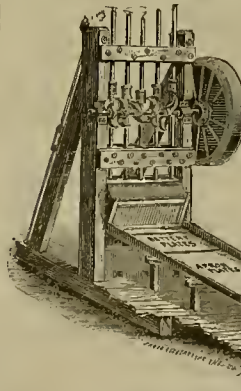
That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

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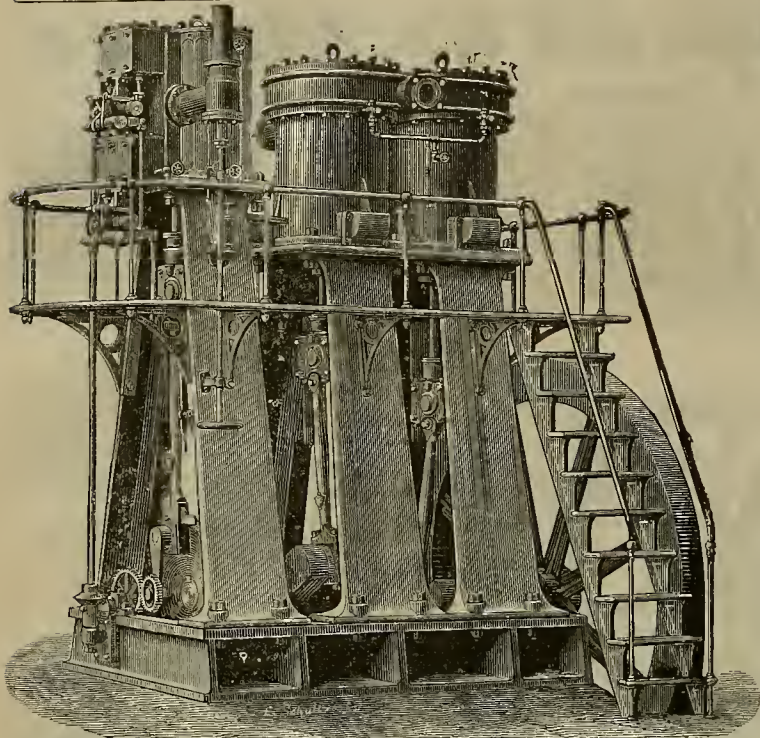
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HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding homastic and pretentious claims by others.

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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, MARCH 10, 1883.

VOLUME XLVI
Number 10.

Saving Gold on Snake River.

In reply to the letter sent us by Mr. F. W. Noble, of Detroit, Michigan, asking information as to the best method for saving the gold on Snake river, and published by us two weeks since, we remark, that the writer of that letter is undoubtedly correct in saying the gold on Snake river, though exceedingly fine, is free from oxide or rust. The trouble in saving it does not, therefore, consist so much in its refusing to amalgamate with quicksilver as in the difficulty of bringing these fine particles in contact with that metal, as used in the ordinary way.

The excessive fineness of this dust is due to the fact that the most of it has traveled a long way from its primary source, hundreds of miles above in the Wind River mountains. The country traversed by the Snake after it leaves these mountains is almost everywhere slightly auriferous, the surface soil in many places showing, under careful prospecting, minute particles of gold. As this is an almost rainless region, but little of this surface soil is ever washed into the river, hence the placers along the latter do not probably receive much enrichment from this source.

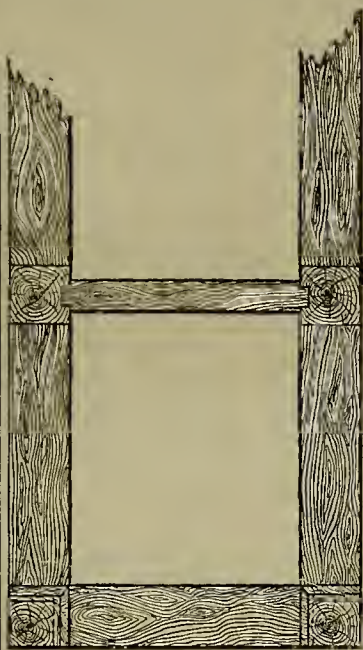
As Mr. Noble observes, there has been no lack of methods and machines which the inventors have claimed would overcome that difficulty here complained of, as some of them perhaps will do, operating in a slow and limited way. But these Snake river placers, in order to pay, require to be worked on an extensive scale, an end that can be accomplished only through the employment of large apparatus and large quantities of water. A closer saving of gold, if any be made, will have to be effected through improvements applied to the sluice as now used. Toy machines, however well they may work in a miniature way, will never do where so much material has to be handled.

The best results in washing on Snake river have been reached through the employment of Denniston's silver coated amalgamating plates, manufactured at 655 Mission street, in this city; these, wherever properly used, having been found to answer an excellent purpose. In the few cases where these plates had failed to give entire satisfaction, such partial failure was due to improper management on the part of those using them, or to the fact that the plates ordered were too lightly coated to do good work, some miners, in the practice of a false economy making this mistake. Plates costing less than \$3 per square foot should never be used for work of this kind. Anything cheaper is liable to cause disappointment, the effectiveness of the plate from \$3 up to \$5 per square foot being in the ratio of the price.

If parties mining on Snake river will supply themselves with these plates, procuring those of the best quality and properly protect them with screens when laid in their sluices, they can hardly fail of success. This done, they will at least have availed themselves of the best gold saving appliances for that class of mines extant, at least, the best of which we have any knowledge.

There is this further to be said in explanation of the trouble that has so attended placer operations on Snake river; the majority of the miners there have had but little experience at the business, being recent arrivals from the east. Besides lack of skill, these novices are apt to

perform their work in a hurried and careless way. In cleaning off the silver plated sheets of copper, where these are used, this is especially noticable, these novices in removing the amalgam, employing often sharp or pointed implements for that purpose. Through this practice the silver coating is scraped off or the plate otherwise injured. The experienced miner

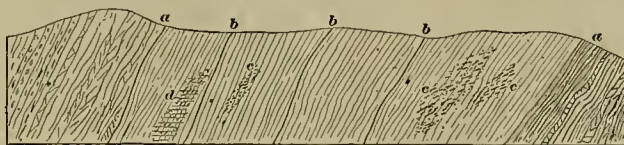


METHOD OF FORMING JOINTS IN TIMBERS FOR MINES.

knows that the amalgam, when very hard should be softened with quicksilver applied with a soft cloth, after which it can be scraped off readily and without injury to the coating of silver.

Mine Timbering—No. 5.

Such is the excellence of the systems of timbering which have been adopted on the Comstock, that they have come into use in all the



CROSS-SECTION OF GOLD MINE IN NORTH CAROLINA.

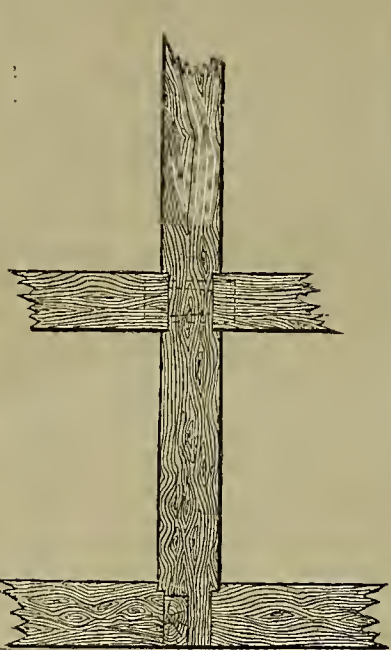
other mining regions on this coast and elsewhere in this country. Carpenters who are used to framing these timbers are in demand everywhere. It was only the other day that the boss carpenter of the Ophir mine was induced to go to Mexico to superintend the timber work to be done on a mine there. We have in this series of articles shown several views of the systems of timbering. The engravings presented herewith show the details of the joints of the timbers for the sets in stopes. The engravings are clear enough to be readily understood without much explanation, the method of framing being apparent by the dotted lines. This will be found useful to miners everywhere.

THE MINING AND SCIENTIFIC PRESS is most assuredly the best paper a miner can read. It should receive the support of every miner. Send 10 cents for a sample copy.—*Georgetown Gazette.*

Distribution of Gold.

The following paper "On Some Peculiarities in the Occurrence of Gold in North Carolina" was read at a recent meeting of the American Institute of Mining Engineers, by Prof. W. C. Kerr, State Geologist, Raleigh, N. C. :

"The distribution of gold is obviously much



wider than is commonly supposed. Besides the usual matrices, veins, or associates, such as quartz, pyrite, chalcopryite, etc., I find it occurring in quite a range of common rocks. For example, at the Rhodes mine, in Gaston county, a body of 9 to 12 feet of decomposed, light-gray gneiss was worked together with the strings of quartz, and yielded from \$6 to \$10 to the ton. A mine in Moore county yields its

northward from near the mouth of the Uharie river, including the Russell, Beck, Laughlin, Jones and others, come under the description just given. These slates, shales, or schists, stand almost vertical, and are generally decomposed to a considerable depth, 20, 40 or 50 feet, and are excavated *en masse*, generally with pick and shovel, sometimes through a cross-section of several hundred feet in length, and the whole mass is carried through the stamp mill and rocker.

"The accompanying diagram represents the last-named mine in cross-section. It is simply an open cut in the side of a hill, 50 to 70 feet high, formed by a ravine which has cut across the strike of the formation. The workable strata, between *a* and *a'*, differ imperceptibly from the bounding rocks, and they pass insensibly into each other, and outside strata becoming gradually more heavily bedded, hard, and quartzose. Within the worked area there are lean strata, that are harder and thicker, and more quartzose or chloritic, as at *b*, *b'*, *b''*. At *d* a portion of the strata is charged with a fine-grained pyrite, that sometimes constitutes a large percentage of the rock for two or three feet in thickness. At *c*, *c'*, *c''*, portions of the strata are crusted with ferruginous scales and limonite, resulting from the decomposition of pyritous masses of slate. This mine may be taken as a type of an extensive zone of mines, that extends even beyond the Yadkin and into South Carolina, including the well-known Brewer mine.

"Within a few months past I have found that the gray, much-jointed quartzites and felsites of the Huronian hills, on the eastern side of the great slate belt, carry a workable percentage of gold through masses of great extent. Gold has also been found by Mr. Hanna, of the Charlotte Mint, in a trap dike that is to be seen in that vicinity. From the facts here given, it would seem that gold is so widely diffused that we may expect to find it in any kind of rock."

Eureka Notes.

The following fresh notes from Eureka, Nev., in addition to what we published on our second page, are contributed by our regular correspondent, Mr. M. H. Joseph :

At the Alexandria mine, the Diligence shaft is being cribbed, and a station is being cut out at the 100-foot level, whence a drift will be run westerly into the hill. More or less ore is being extracted from the old workings, and the work of developments will be vigorously pushed along in the lower levels as soon as the station mentioned is made ready for the work.

At the Grant mine, on Prospect mountain, near Ruby Hill, a drift is being driven towards the Grant incline shaft, where there is a large body of low-grade quartz ore in sight. This drift is already in ledge formation, and promises well for valuable developments.

There are four men at work in the Uncle Sam crosscut of the Albion mine, where the indications of ore are said to be improving. The wages of these men are guaranteed by parties who are anxious to discover new ore bodies. Mr. F. J. Reed, superintendent of the Eureka Con., has charge of the work at present, and I believe will continue in charge. He thinks that the chances for making the mine pay by economical management are good. No arrangements have yet been made to pay up the company's indebtedness. A miners' meeting is now being held at the Courthouse.

The ore from the Richmond mine is said to be improving in quality; it carries a large percentage in gold.

A fine vein of rich carbonate ore has been struck in the Members mine on Adam's Hill.

At the Silver Nugget mine on Silverado Mountain some very heavy lead ore of good quality is being extracted. It is said that the Rescue mine will be equipped with a steam hoisting engine in a few weeks, and work will be resumed thereon as soon as it is placed in position.

"The range of noted mines extending 20 miles

CORRESPONDENCE.

Notes from Eureka, Nevada.

[From our Regular Correspondent.]

At the Eureka Con. everything is running smoothly, with little or no change to note. The new machinery is working to a charm.

The Richmond Con. paid a dividend in London, on the 7th inst., of five shillings per share. Exploration work is being carried on with energy in 23 different places in the mine. There is low grade ore in several of the drifts, and some good ore also. The Eureka Tunnel improves daily. While excavating over the engine shaft to make place for the machinery, a vein was discovered from which five sacks of rich lead ore was taken. This will be developed in due course. The 105 level, south drift, has been extended during the week to the Luke chamber, where the ore is striking easterly and gaining strength with its dip. West of this is the Addison chamber, now producing some of the finest quality of ore that has yet been taken out of the mine. It is very heavy, and assays about \$150 per ton, all in silver. It runs in and out among howlders of lime and promises to make into a good sized body at greater depth. As nearly as I can judge this is situated about 60 feet south of the tunnel line and 115 below it in depth.

At the Silver State mine, the east crosscut from the tunnel is in a more favorable formation than I have ever seen it before. The seams are filled with talc of a greenish hue, and black oxides of manganese. The rock has changed from very hard to a medium hard and soft picking. At the Grand mine the tunnel has been driven about 150 feet to the Geraldine shaft, and from that point it has been run in an irregular northeasterly course, following open seams that make around huge limestone boulders. The indications are favorable for striking ore. A new drift will be run towards the foot of the main incline shaft where there is a large body of low grade quartz, intermixed with which are veins of very rich yellow carbonate ore. At the Fair Play mine,

Pinto District,

work has been suspended for the present, on account of the absence of the superintendent, who is also a large owner. This is an excellent property. It has an incline shaft down 140 feet, at the bottom of which is a very promising ledge formation carrying ore of high and low value. In the upper stopes the vein has been much narrower, but the ore has been sufficiently rich to pay expenses and leave a balance to the account of the owners whenever shipments have been made. The Sparrow mine, near the Fair Play, has splendid croppings of fine quality ore, traceable upon the surface for a distance of 300 feet. An incline shaft, sunk upon the fissure to a depth of thirty feet, is in excellent ledge matter, showing heavy galena ore of high grade. These mines are in that portion of Pinto district known as Alhambra hill.

Silverado Mountain,

Which lies to the westward of it, is at present receiving a great deal of attention from local mining men. The Berryman Brothers are here working actively and deriving good profit from their labor. They are now engaged in removing the waste rock that has accumulated in the old chambers of the Diagonal mine, where there has been stripped and broken down, large quantities of quartz that will work at the furnaces \$50 per ton. All through it there is a great deal of very rich ore. They expect to ship 100 tons of this in about two weeks. The prospects in other parts of this mine are excellent. A small seam of ore has been found in the south drift, 50 feet below the tunnel level. This will be followed and opened up shortly, as here is where it is expected that the continuation of the ore chambers above will be found. Some very fine ore is being extracted from the Silver Nugget mine adjoining it. It is rich in fact as it is in appearance. The Western Globe mine loses nothing in value as development work is pushed along. The main shaft is now down 120 feet from the surface, and 60 feet below the tunnel level, from where some very rich ore is now being extracted.

The Berryman Tunnel and Mining Company are proceeding cautiously to work. A small force of men are employed prospecting upon the surface of their claims, with a view to ascertaining the best place to commence driving their tunnel. The result will probably be made known after a meeting that is to be held in about two weeks from date hereof.

Good reports are coming in from the Spring Valley Mines, although they are being worked on a very limited scale. I intend making a trip to that locality as soon as the snow disappears.

M. H. JOSEPH.

THE CANARY BIRD BUSINESS.—It is estimated that there are at least 14,000,000 pet canary birds in the United States, which annually consume 168,000,000 (\$4,000,000) of seed, costing to consumers at least \$14,000,000. There are 22 manufactories of cages, which turned out 1,000,000 cages last year, worth about \$2,000,000.

WASP NESTS DANGEROUS.—It is said that wasp nests sometimes take fire spontaneously, ignition taking place from the chemical action of the wax of the cells upon the paper covering of the nests.

Humboldt County Lumber Interests.

The annual report of the Chamber of Commerce of Eureka, Humboldt county, by John Vance, President, and Fred W. Bell, Secretary, contains much interesting information concerning the progress of industry and enterprise in Humboldt county. It is claimed that there is discernible a greater disposition toward effort and investment in developing the resources of the county at present than ever before in its history. Wealth does not now go out of the county to carry on enterprises, more or less satisfactory, in other fields. On the other hand, the returns from remunerative home investments are aiding in various public improvements which are vital to the future growth of the county. It is indeed a fortunate county which can say this. There is also considerable outside capital coming in continually and finding satisfactory opportunities for profitable enlistment.

The lumber interest of the county is, of course, its leading source of wealth. It is shown that the exports of sawmill products to domestic ports during the last year reached a value of nearly \$2,000,000. The forest is, however, receding, and new enterprise is being required to bring the logs to the saw and the product to the ship. The report says:

The time has gone by when our foremost interest must depend on the primitive method of the past to supply the stock on which our mills are to be kept running. The "snaking" process, with the stag team and the truck and tramway, or the uncertain floods of winter, can neither singly or all together afford the needed facilities of transport from the heart of our forests to tide water. Lines of railroad diverging from the bay and reaching their limit by the cheap and easy grades of our principal valleys to the remoter parts of the county, is a magnificent scheme of internal improvement for us. While it would give to the mill and timber interests guarantees of almost unlimited development, it would in a corresponding degree give a vigorous push to every other form of production. The system of improvements referred to is evolved from enterprises quite distinct in their organization, each of which must rely for maintenance on the advantages of route it may respectively occupy.

Embracing the different lines within the county, we begin, at the north in their order, with the Trinidad Mill Co.'s railroad from the port of Trinidad to Big Lagoon, ten miles in length. Some four miles of this road is completed and in running order, the balance will be completed during this year. Next, the Vance railroad, ten miles in length, crossing Mad river four miles from the mouth, and in the direction it is now penetrating is unsurpassed for the scope and quality of forest treasures it must bring to its support. The extension of the Arcata Transportation Company's railroad gives it a present length of about eight miles, with a proposed terminus some two miles up the south side of the same stream, the whole of which will be completed before the close of the present year. After the Arcata we come to the late enterprise of Flannigan, Brosnan & Co., a short line on the east of the upper bay, and the Carson road of about the same extent; and lastly, on the bay to north of Eureka, the Freshwater railroad of D. R. Jones & Co., seven miles in length and yearly being extended. These are all constructed by private parties, with the most substantial of roadbeds, iron T rails, thoroughly equipped and operated by first class locomotives. Like those just mentioned, the Elk river railroad (projected by an incorporated company) has special reference to the opening up of a vast body of redwood situated on and adjacent to its route. This will terminate at the old site of Bucksport, and be of a length of eight miles. The company has done the preliminary work for grading and construction the ensuing summer. But, perhaps, the most important of all, as affecting the material interests of our people, the transportation of merchandise and farm products, are the two railroads lately projected from the bay by the way of Eel river valley toward the southern and southeastern portions of the county. Both franchises are incorporated and known under the respective names of the Eel River and Eureka R. R. Co. and the Humboldt Bay and Eel River Co. The former extends from Eureka 45 miles, following in part Eel river valley and terminates on the Van Duzen fork. The latter, starting from Southport on the South bay, follows the same valley 25 miles with a present terminus fixed at Eagle prairie. Work on each of these enterprises is actively prosecuted, and in the early spring a large force of laborers will be required with a view to carry them to a speedy completion.

Certainly, with these radiating railroads, owned chiefly by residents, the county will be better provided with means of transportation than most other counties in the State, and all classes of produce can be brought to the seaport, whence cheap water transportation can be had to other markets.

SIXTEEN MILLIONS PER ACRE.—A lot at the corner of Broad street and Exchange Place, N. Y., recently changed hands at the rate of \$15,000,000 per acre. The ground for the Drexel building was purchased at the rate of \$14,000,000 per acre. The most desirable lots on Broadway are selling at the rate of \$2,000,000 per acre. Real estate in New York is "up."

The consumption of tobacco in France during the past five years has averaged 33,000 tons. The revenue amounts to \$50,000,000 a year.

San Bernardino Mines.

The *Calico Print* says: We often hear new comers, after they hastily examined some of the mines of this district make the remark: "Why don't they go on with their work of developing? are they afraid to go down?" In most instances we think this question can be satisfactorily answered. Of course there are some prospectors who have put up monuments on some land, dug a small hole in the ground, and then walk the street imagining that they will soon be millionaires, that some unsophisticated capitalists will come along, seize their immensely rich specimens with avidity, and give them a big check for their "mine." It is unnecessary to say anything further concerning such, but to leave them to the inevitable result of their folly.

There is another class of prospectors who have located claims, prospected them and taken out small quantities of good ore, but are unable to develop them very rapidly on account of a lack of means. This class hold their claims at a higher figure than capitalists are willing to give, and they would prefer to work their claims themselves and make them pay as they go down on them. There are others who have good claims which they are working cautiously, but surely, with as little expense as possible, but have no intention of stopping until they have exhausted their mines. Because they move slowly some persons think they are afraid to go down; but such is not the case.

There is another class that have the means to develop their claims, but when they strike a rich deposit which soon "plays out" they stop operations, and proceed to figure around to get some one to buy them out or take an interest. Such persons are unwilling to take the chances incident to mining or any other business where there is a liability of failure. They act very unwisely, for it is unreasonable for them to expect that any one else will invest in claims that they are afraid to develop. If they sell at all it will be at a very low figure, the purchaser being willing to risk only a small amount in further testing the merits of the claims.

This camp is new and very little has been done towards developing the mines until recently. Operations have commenced in earnest on the King, Burning Moscow, Oriental, Silver Odessa, San Houston, and others, and by the time the Oriental mill is completed there will be many thousands tons of ore ready to be milled. There is a great deal of rich ore in sight and the indications that the mines are rich are unusually good. Old miners declare they have never seen a district that possessed such flattering prospects on the start as this. Even the outlook of Virginia City during the first year was not so bright as can be seen here. This camp is building up on its own merits, and in the near future the quantities of bullion that will be produced will show to the world the richness of our mines.

Assessable Stock.

At the risk of being thought tedious, it seems important that attention should be again called to the importance of a change in the corporation law, which shall allow mining stocks to be assessed. The matter entered somewhat into our late election, and it was then understood that the several candidates were heartily in favor of such a change. The law of Nevada or California upon this subject would be most acceptably applicable to the situation of things in this Territory. Of course, if corporations do not like the assessable plan, they can incorporate in New York or Boston. The interests of miners, investors and business men are involved in this matter. The general interests of this Territory, of farmers who have anything to sell, of freighters and men whose business depends upon the healthy development of our resources, demand that the statutory embargo on mining enterprise, by which that industry is stagnating on account of the legal prohibition against assessments on mining stocks, shall be declared raised.

There are many mines about Butte, and for that matter all over the Territory, that would be adding to the general prosperity of the country if they could by any means be developed to the point of production. There are plenty of mines in the country owned by poor men who would gladly surrender a portion of their property for the sake of having the remainder made valuable. The men of this region are out here to take chances. The most of them would take stock in promising undeveloped property, and pay in their assessment of 10 or 15 cents per share like little men, if the opportunity were given them. A very large number of laboring men became wealthy in Nevada by such means in early days. It is to the interest of men having money invested in realty, and to men in business in proximity to mines, that their investment shall be enhanced in value, and their business augmented by the development of such mines. Every man doing business or living in Butte is interested that every mine in his neighborhood shall be giving employment to somebody, or adding something to the wealth of the country.

The non-assessable stock plan has been tried and found wanting. The men holding stock in mines organized under the corporation law, however anxious they may be to see development going on, are absolutely helpless. They can get nothing for their stock, and have no way of procuring means for development except by mortgage, which is sure to wipe all stock out upon foreclosure. The history of the Belle mine, one of the most promising properties in Summit valley mining district, is a good illustration of how the non-assessable plan works. The paid up

stock sold readily on the strength of the promise of the mine. Extensive improvements were made; but before the mine had commenced producing bullion the encumbrances thereon fell due, and stockholders had presented to them the alternative either to clear off the encumbrances or lose their stock. To clear off the encumbrances it was obvious that all stockholders must act in unison. If an assessment had been possible, many of the stockholders would gladly have protected their stock in this manner, the delinquents would have been sold out, and work would have gone ahead without delay. That the matter was arranged in a way that enabled investors to save a portion of their investments was no credit to the old law.

The experience of Montana in its quartz mining interest should be its guide for the future. Up to 1872, mines were held all over the country by record title. Nobody would work them, because the title was indefeasible and without condition. The rich mines of Butte were all recorded, but the place remained a dwindling placer mining camp. The law of 1872 did not become operative until 1874, from which time the prosperity of this as a quartz mining camp dates. It is safe to say that Montana was set back 10 years in development through an unwise enactment. Railroads and the later progress that has overtaken Montana would, without this fool law, have struck the Territory long before. The Legislature cannot now afford to tie the hands of one of our most important industries through unwise legislation. Give the brave hearts and willing hands in the Territory some protection for their labor and investment, that they will not be at the mercy of stock jobbing wreckers, and the wealth of the Territory will be increased and its mines developed.—*Butte (Montana) Miner.*

DEEP SPRINGS MINING DISTRICT.—Mr. S. P. Roberts, of Big Pine, sends us the following description of that portion of Deep Springs District formerly called Pine Mountain District: "This lead or galena belt is situated on the eastern slope of the White Mountains about six miles west of Deep Spring Valley, and fourteen miles (via Black Canyon) from the line of the C. & C. R. R. This galena belt is about six miles in length and from one half to three fourths of a mile in width. The formation is lime and slate. The veins run in a northerly and southerly direction, and dip to the east at an angle of about 45°. They vary in width from six inches to seven feet, with lime hanging walls and slate foot walls. Some forty-two locations have been made and there is room for many more. Thus far but little prospecting has been done, though with encouraging results. One mine has been developed to a depth of between 80 and 90 feet and shows a large and well-defined chimney of ore from 3½ to 4 feet wide; good judges say there is \$10,000 worth of ore in sight. On the same hill are two more claims which have been worked. One has a shaft 65 feet deep, showing 3½ feet of ore. Six assays from this claim average \$55.80 silver, 63 per cent lead and \$9 gold. The other mine shows a solid body of carbonate galena chloride ore 7 feet between the walls, the whole of which will work in a furnace \$53.60 silver and 65 per cent lead per ton. Eighty assays of ore from a number of claims here, made at the Standard office at Bodie, gave an average of \$50.90 silver, 48 per cent lead and \$8.60 gold. I have been engaged in handling lead ores for the past 16 years, have visited most all the leading lead or galena camps on this coast, and will say that the outlook here, for the amount of work done, is 50 per cent ahead of any camp I have ever seen. It is the right formation for lead ores. Here are thousands of acres of nut pine timber which can be utilized in making smelting coal. The summits of the mountains are covered with a heavy growth of tamarac from 6 inches to 3½ feet in diameter and from 20 to 60 feet in height. There is an abundant supply of good water, also iron, fire clay and, in a word, every facility to smelt and reduce these galena ores. There are no rebellious metals to contend with. The country is easy of access.—*Ingo Independent.*

COMET DISTRICT.—During the week reports of big strikes and samples of rich ore were brought into Pioche. The claim owned by Col. Jack O'Brien and Rafe Barton have now about three feet of good ore, with a very rich streak, four inches in width, running through the center of it. Assays from samples of this rich streak brought to town showed \$1,600 and \$2,300 in silver. Barton claims that the ledge will average \$500. We learn from Charley Hopkins, who returned from Comet during the week, that John Ince has opened up on his claim a cave, or what appears to be a natural tunnel, of ore, about three and a half feet in width. This ore is soft, but there are large chunks of carbonate ore through it, large chunks having been taken out. Two assays made of this ore by Hopkins Thursday afternoon went \$144 and \$183 in silver. The owners of this claim, we believe, are Jno. Ince, Ed. Freudenthal, Steve Draghevitch and Dave Kent. Ed. Pierson and Jim Clark have also discovered a claim with very favorable indications. Owing to these and several other discoveries made in Comet District, quite little excitement is existing in regard to this locality. The formation of the district is white lime, and everything that has been discovered is yet on the surface. We hope the work of development will prove as good as the sanguine expect. Where there is so much rich ore on the surface, it is natural to suppose there is a big mine somewhere in the locality.—*Pioche Record.*

MECHANICAL PROGRESS.

Strength of Timber.

Timber from the heart of a tree is stiffer than the sap-wood; that from trees of average age than that from old trees; well-seasoned timber than that of green, and generally the stiffness increases with the weight, or rather the specific gravity. The same rules apply to the strength of the timber. If the quantity of timber be the same, the stiffness of a beam will increase with its depth, but care must be taken not to make it so narrow as to incur the danger of tipping over. Hence, to determine the size of a beam to be fixed at both ends, a series of rules are given, one of which will serve as an example.

Rule.—When the breadth, length and weight to be sustained are given, to find the depth.—Multiply the square of the length in feet by the weight in pounds, and this product by a number varying according to the kind of timber (in the case of good white pine, it would be about .025). Divide the product by the breadth in inches and the cube root of the quotient will be the breadth in inches. Rule for finding the breaking weight of a piece of timber: Multiply the breadth in inches by the square of the depth in inches. Divide the product by the length in feet, and the quotient, multiplied by a "constant," depending upon the kind of wood, (for white pine about 650), will be the weight in pounds. If the timber be supported at one end only, but one fourth of this weight would be required to break it. If the weight be uniformly distributed over the beam, it will require twice as much to break it as if the load is collected at the middle.

A force tending to compress a pillar or other piece of timber may operate in several ways according to the height and thickness of the timber. If its height be great in proportion to its diameter, it will bend, and if the weight be sufficient, break at the middle. This will be the case if the height be greater than 30 times the diameter. If, however, the pillar be short, it will be crushed. As concerns its power of resistance to crushing, the seasoning of wood makes a great difference, as wet wood has little more than half the strength of dry. For strength in this particular, good oak is to be recommended, after that pine. The strength of a long pillar is about three times as great, if the ends are flat, as if they are rounded. Giving pillars a bulge at the middle somewhat increases their strength. Of course, short pillars are much stronger than long ones. A column of pine 14 inches high and 14 inches square, has been known to support a weight of nearly 1,000 tons.

If wood be strained lengthwise, its power of resistance will vary directly as the area of its cross section and inversely as the length of the piece and the force employed. This holds true as long as the elasticity is uninjured, but after that is impaired, the strength of the timber is materially less. The weight required to overcome the cohesion of pieces of oak about a foot in length with a cross section of one square inch varied between 18,000 and 20,000 pounds. A similar piece of pine was pulled apart by a force of about 13,000 pounds.—*Wood Worker.*

MACHINERY AND LABOR.—Some men, especially mechanics, never seem to be able to learn the lesson that a slow machine is often cheaper than a fast man. The other day, when talking with a very expert machinist in regard to a certain job of work, he said that he could do it in 15 or 20 minutes any time, and in about half the time which it would take the ordinary machine to perform the same job; but he forgot that he is worth about \$4 per day, while the machine and the boy to run it is probably not worth more than half as much. The complaint is often heard that planer hands, lathe hands, drill press hands and special tool men are driving out the good and expensive machinists; that the boy learns to run a drill press, and so takes the bread and butter out of the mouths of men who not only know how to handle a drill press, but to make it, as well, if necessity comes. The fact is forgotten that when the drill press is simplified so that a boy can do a certain class of work on it, a great many extra boys and drill presses can be employed doing work which it would never pay to do if the first-class machinist had to furnish the labor. The machinery in such cases lifts boy and machinist together. The man that has the brains and skill is taken where his brains and skill are of the most value, and the day laborer finds himself in a better position than before. Instead of turning a crank to furnish power, as was the fashion years ago, he has advanced several steps, and is, perhaps, at a drill press or an emery wheel, or doing a class of work considerably more valuable than that which he would have had in the last generation.

AN IMPROVED HORSESHOE.—A patent has been taken out for a horseshoe made by pressing cow-hide into a metallic mold and then treating it with a chemical preparation. It is claimed that this shoe can be put on so tightly that neither water nor dust can get between the hoof and the shoe; that its elasticity makes the horse's step surer and lighter; that it is more durable than the ordinary shoe, requires no calks, never injures the hoof, and is, of course, much lighter than the metallic shoe.

A Walking Power for Street Cars.

Another factor has appeared in the attempts to cheapen the cost of running street cars, and thus proportionately reduce the rate of fare. This time it is a motor invented by B. C. Pole, an engineer of large experience in the service of the United States Government. The motor does not employ steam, and it weighs only 4,000 pounds, a weight easily carried by the street rails now in use. The force is derived from an Otto or similar class of gas engine, into which coal gas is fed from a tank or reservoir. After its injection into the engine it is exploded, and this explosion, operating upon a series of pumps or valves, sets in motion the movements of the motor. In the first place, there are two fluid cylinders so arranged as to bring the pressure of the fluid upon a foot, which goes down upon the cobbles between the tracks, making a step of three feet two inches in length; and every time this grip-like device, fitted with teeth, and nicely adjusted for securing purchase or hold, makes a step, the motor is propelled or pushed forward three feet two inches, the steps to be decreased or increased by regulation from the engineer. The foot is padded with rubber, which gives its stroke upon the earth such elasticity that there is no jar or sudden start.

Immediately over the top of the foot as it rests on the earth are two air cylinders connecting with the feet by a swinging shaft. Upon these feet they bear a pressure of 500 pounds. The action of the air and fluid pressure is simultaneous in effect, and when the power of propulsion by the latter has been expended the former lifts the feet, and the counter action of the hydraulic cylinders takes them forward for the next backward or propelling movement. The operation of the machinery is described to be as simple as the movement of an elevator.—*Philadelphia Record.*

CUTTING SLOTS IN IRON BARS.—Our readers are more or less familiar with the work of the "fusing disk" used for cutting iron bars in rolling mills and elsewhere, but we are confident that the following from a correspondent of the *American Machinist* will prove novel to most of them. Having to cut a slot one inch by two and one fourth in the ends of a large number of steel bars three eighths inch thick, he thus describes his mode of proceeding: "First, I drilled an inch hole two and one fourth inches from the end. I then took out my emery wheel and put in its place a disk 12 inches diameter, No. 14 sheet iron (scant one eighth inch thick.) I also made a table with a gauge to rest the fly bars upon, with a lever at the back end to press the bars to be slotted against the revolving disk. I made two slots at each end with the wheel, cutting to the hole. I cut them at the rate of a trifle over four inches per minute (made 18 cuts in 10 minutes). I also found that when I run the edge of the disk in water it cut twice as fast as when I ran it dry. The motion of the disk was 2,800 revolutions. I think a higher speed would have made quicker work, but I could not speed it any higher without making changes in my pulleys, which I did not care to do, as it worked very satisfactorily as it was."

IMPORTANCE OF LITTLE THINGS.—One of the most difficult things to make an ordinary mechanic understand is that two things cannot occupy the same place at the same time. It is consequently a never ending source of wonderment to him when he finds that lace, a gelatine film or a pressed flower can be made to give an impression in lead, or even in soft steel, when passed between the rollers of a transferring press. That the soft substance can indent the hard one taxes his credulity to the utmost; and when he sees the work done, he is ready to disbelieve his own eyes. When such a man finds the print of a hair on his cold forging, or a thousand and one other instances illustrating this fact that two substances cannot occupy the same space at the same time, his wonderment exceeds all bounds, and yet, though slow to believe such a demonstration as this, it is easy to accept the fact that a little water on a piston may be sufficient to smash the cylinder or blow off the head, which is only another illustration of the same fact.

POWER ABSORBED BY BRAKES.—On the Metropolitan Railway of London the stations average but half a mile apart, and although the engines are as powerful as those on the Great Northern railway, while the trains are far lighter, the average speed attainable is only 12 miles an hour. No sooner has a train acquired a reasonable speed than the brakes have to be sharply applied to pull it up again. As a result of experience and calculation it is found that 60% of the whole power exerted by the engine is absorbed by the brakes. In other words, with the consumption of 30 pounds of coal per train mile, no less than 18 pounds are expended in grinding away the brake blocks, and only the remaining 12 pounds is doing the useful work of overcoming frictional and atmospheric resistances.—*Ex.*

HOW TO TEMPER A SMALL SPRING.—Heat the spring to a light red, dip it in water, not too cold, then make a small fire with some fine shavings and hold the spring over the flames until it becomes black all over; then hold it in the fire until the black coating disappears. The spring must then be swung in the air until it is almost cold.

SCIENTIFIC PROGRESS.

Mr. Edison on Storage Batteries.

A representative of the Boston *Sunday Herald* called upon Mr. Edison some time ago, with the object of ascertaining his views upon the electric light in general, and the outcome of the interview furnishes some very interesting reading. He seems to think, and many others with him, that the so-called storage batteries, whereby electricity is to be delivered to consumers, all really bottled up and ready for use, is a delusion and a snare, when commercially considered. In the course of the interview he made use of some very plain language, a portion of which we reproduce. Mr. Edison said:

"The storage battery is, in my opinion, a catch-penny, a sensation, a mechanism for swindling by stocking companies. The storage battery is one of those peculiar things which appeal to the imagination, and no more perfect thing could be desired by stock swindlers than that very self-same thing. In 1879, I took up that question, and devised a system of placing storage batteries in houses connected to mains, and charging them in the daytime, to be discharged in the evening and night to run incandescent lamps. I had the thing patented in 1879 (I forget the date of the patent), but there is nothing in it. I rung all the changes on it. My plates were prepared like Plante's. The method of preparing them for charging is more tedious, but it is better than that of Faure, after preparation. You know the first storage battery was sent from France to Sir William Thompson, who was at first astounded by it. He was asked to endorse it, consented and took a retainer, but on investigation he became convinced that there was nothing in it, and returned the retainer to the French company. The fact is, the more he investigated the more he found out the fallacy of the whole business. On account of what Labouchere calls a swindle, this secondary battery has been used by the arc companies of England. One company alone, on the strength of an accumulator and an incandescent lamp copied from mine, floated subsidiary companies, whose aggregate capital was over \$30,000,000, and immense sums were paid by these companies to the parent company for rights. Within the last few months the bubble has burst, the shares, upon which \$25 have been paid, are offered at \$1, and the swindling companies have been sued for making misrepresentations in their prospectuses, and judgment has been recorded against them.

Scientific storage is all right, but commercially an absolute failure. You can store it and hold it; but it is gradually lost, and will all go in time. Its efficiency, after a certain number of charges have been sustained, begins to diminish, and its capacity and efficiency both diminish after a certain time in use, necessitating an increased number of batteries to maintain a constant output. Owing to corrosion of the sustaining plates of the battery, the effect of local action and other causes, too many to enumerate, the yearly depreciation of the battery is not less than 30 per cent. of its first cost, if used daily.

I will tell you where the fallacy in this arrangement lies. It consists in the fact that the cost of batteries to store this extra electricity that could be produced in the daytime would be twice as much as the station that produced it; so that, if the company has already invested \$100,000, and agree to utilize their machinery in the daytime, by the addition of storage batteries, they will find that to carry out their desires it will cost them \$200,000 for the batteries. I will guarantee that not one board of directors in a hundred will see it, and the parent concern will not tell them of it until after they have purchased. It seems to be natural with boards of directors, that if there be a wrong way to do a thing they will surely do it that way.

Astronomical Distances.

In a recent lecture on astronomy, delivered by Prof. C. A. Young, the lecturer made use of the following very striking illustrations to convey an idea of celestial distances:

"We have been able to make out pretty certainly the size and dimensions of our own earth. That is not so very difficult. We have reached out further, and now we are able to tell with considerable accuracy very nearly how far away and how large the sun is. We are trying to reach out for the stars. We cannot tell exactly how far they may be, but we know that our nearest neighbors are at a most tremendous distance—beyond the reach of human conception. The earth is about 8,000 miles in diameter. If you could make a straight railroad around the equator, it would take just about 26 days to make the circuit of it, at 40 miles an hour, without any change of stations. No practical means of conveyance will take you around it in less than three months. Then the moon, our next neighbor, is about thirty times as far away as the earth's diameter—about 240,000 miles. That is not so very inconceivable. When we come to the sun, we find its distance is about four hundred times as great as that of the moon, about 95,000,000 of miles.

"Those figures mean nothing until you take an illustration. Take a railroad from the earth to the sun, with a train running 40 miles an hour without stops, and it would take about 265 years and a little over to make the journey. So that, if the first settlers of this country, at

the time they started from the mother country, had started from the sun by this railroad, they would be just about reaching this country now. But very few of them could have afforded it, for even at a cent a mile the fare would have been \$950,000. There are very few people, even in New York, who could afford to go to the sun at that rate of cheap fare. But when we come to consider the nearest star, whose distance is two hundred thousand times as great, we can do nothing with it, even in our imagination. If we should count the money that it would take for a railroad journey to it, even at a cent a mile, it would come to two hundred thousand millions of dollars—a hundred times the amount of the national debt of the United States."

The Origin of Petroleum.

Mr. Max Livingstone, in a paper lately read before the Western Society of Engineers, made the following remarks on this interesting subject:

"To explain this, in the highest degree interesting and important question, theories without number have been propounded, but although men eminent in scientific circles have wrestled with the problem, we are far from a satisfactory solution. For this reason, it would be more gratifying to myself to dismiss the subject as to embryonic, were I not conscious of the curiosity which many of the gentlemen present feel to hear something, no matter how hypothetical, regarding the formation of petroleum.

"I shall but briefly refer to a few plausible theories. According to one, the oil is indigenous to the sand rock, and is supposed to have been elaborated by nature from organic matter, which, during the paleozoic ages, when submarine plants and premodern animals flourished in abundance, were deposited simultaneously with and in the sands. But when, and by what means these hydrates and mollusks could have been converted into oil so completely that not even a trace of them has been found, and how this oil, during incalculable ages, subjected to revolutions of the most violent character, could have been preserved is beyond our comprehension.

"Diametrically opposed to this hypothesis is the theory that oil is a product of condensed gas, distilled, so to speak, at a great depth, where the temperature is sufficiently high, from organic deposits in the beds of the silurian and devonian formation. The gas thus generated is forced to the upper and cooler strata, where it is absorbed, and, as far as possible, condensed into liquid in the sponge-like reservoirs—the sandstones. Analogous to this, only combating the organic origin, is the theory propounded by Prof. Mendeleeff. Calling into requisition the nebular hypothesis of Kant and Laplace, and assuming that the interior of the earth contains large masses of metal and carburetic compounds, he draws the following conclusion: "Through some of the fissures in the crust of the earth, occasioned by the upheaval and depression of the surface, water percolated to the carbureted metals and acted upon them at high temperature and elevated pressure, thus forming metallic oxides and saturated hydrocarbons. The latter rose in the form of vapor and became converted into liquid, as before described.

"But all these theories have many vulnerable points, which to expose at this time would lead us too far. Neither can I spare the time, nor have I the inclination, to speculate on the probable amount of oil likely to be produced yet, until the explored oil territory has been drained. Experts have given us figures and opinions, supported by ingenious arguments, which in many instances were refuted before the printer's ink had time to dry. The oil territory, distributed all over the globe, is so vast that we need not fear its early exhaustion, and I venture to assert that its classical domain, so to speak, will for some time to come be the State of Pennsylvania."

MINERALOGICAL NOTES.—In a late "Contribution to Mineralogy," Prof. Genth, who possesses to an eminent degree the ability to discuss the important questions involved in the chemical changes taking place in the mineral kingdom, has added a number of important facts to science on the subject of alterations in mineral, which he has made a special study, and of which the present paper is but a continuation of others that have already appeared. Prof. Genth describes in this contribution the partial alterations of corundum, found in Madison county, North Carolina, into massive greenish-black spinel. He notes the occurrence of a pink corundum from Towns county, Georgia, surrounded by greenish white cleavable zoisite; also the alteration of corundum into feldspar, near Media, Pa., and similar alterations of corundum (also into mica) were observed in specimens from Heywood county, North Carolina. The author also notes the alteration of corundum into margarite, fibrolite and cyanite, and describes examples of these. The following are also among the interesting alterations noticed by the author, viz., orthoclase into albite; talc into anthrophyllite; and pseudomorphs of talc after magnetite. The paper, besides several special investigations on other minerals, records the interesting observation of the accidental formation of artificial crystals of rutile during fusion with potassium hydrogen sulphate; two crystals of octohedrite showing a decided blue color, were produced at the same time. These investigations have an important bearing on the genesis of a number of mineral species.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQNT SALE.	SECRETARY.	PLACE OF BUSINESS.		
tion Con M Co.	Nevada.	13.	70. Mar 6.	Apr 9.	R L Shainwald.	327 Pine st.	
nces S M Co.	Nevada.	21.	25. Feb 6.	Mar 13.	Apr 2.	E H Burris.	309 Montgomery st.
chdel Con M Co.	Nevada.	14.	30. Jan 13.	Feb 21.	Mar 13.	E M Harris.	327 Pine st.
ntion Con M Co.	California.	10.	10. Feb 21.	Mar 13.	G W Sessions.	309 Montgomery st.	
ntion Con M Co.	Nevada.	9.	10. Jan 18.	Feb 21.	Mar 13.	W H Watson.	302 Montgomery st.
ndle Con M Co.	California.	2.	50. Mar 15.	Apr 16.	May 16.	G W Sessions.	309 Montgomery st.
lifornia M Co.	Nevada.	7.	20. Feb 27.	Apr 6.	May 4.	C P Gordon.	309 Montgomery st.
lavers M Co.	California.	11.	05. Jan 23.	Feb 24.	Mar 21.	A B Paul.	328 Montgomery st.
hampion M Co.	California.	11.	10. Jan 26.	Feb 28.	Mar 21.	Thos Wetzel.	522 Montgomery st.
rand View Con M Co.	California.	1.	05. Dec 16.	Feb 14.	Mar 14.	W H Penhield.	100 Liederdorf st.
nces M Co.	Nevada.	10.	30. Jan 13.	Feb 21.	Mar 13.	C R Edge.	224 California st.
depenen M Co.	California.	10.	30. Mar 5.	Apr 10.	May 2.	J W Peck.	310 Pine st.
nces M Co.	Nevada.	35.	10. Feb 27.	Apr 4.	Apr 23.	R E Kelly.	419 California st.
ayflower S M Co.	Nevada.	3.	07. Feb 3.	Mar 8.	Mar 28.	G Perry.	240 Montgomery st.
exican G & S M Co.	Nevada.	22.	1. Feb 10.	Feb 12.	Mar 19.	A P McCoy.	309 Montgomery st.
lverage M Co.	Nevada.	55.	50. Feb 2.	Mar 7.	Mar 27.	F B Holmes.	309 Montgomery st.
lver Hill Q M Co.	Nevada.	3.	1.00. Jan 20.	Mar 20.	Apr 10.	J W Pew.	310 Pine st.
lver Hill M Co.	Nevada.	13.	05. Feb 7.	Mar 13.	Apr 3.	W F Dean.	309 Montgomery st.
lver Hill Con M Co.	Nevada.	05.	05. Feb 29.	Mar 13.	Apr 3.	L J Quarrell.	SE Montgoy & Wash
Maguel & La Trinidad M Co.	Mexico.	1.	1.00. Jan 29.	Mar 8.	Mar 29.	H Nielsen.	210 Front st.
ah S M Co.	Nevada.	43.	1.00. Feb 7.	Mar 15.	Apr 5.	G C Pratt.	309 Montgomery st.

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

cker Divide M Co.	California.	7.	20. Jan 12.	Feb 26.	Mar 17.	D M Kent.	330 Pine st.
ommonwealth Con M Co.	Nevada.	5.	25. Jan 12.	Feb 16.	Mar 8.	P F Marhardt.	311 Montgomery st.
nteract Gravel M Co.	California.	11.	05. Dec 12.	Mar 1.	Mar 19.	H Kunz.	209 Sansome st.
kselcor W & M Co.	California.	4.	1.00. Dec 28.	Mar 20.	Apr 12.	W J Stewart.	215 Sansome st.
kselcor Deep Grav M Co.	California.	21.	25. Feb 9.	Mar 15.	Apr 4.	T J Wattson.	116 Davis st.
lver Villa M Co.	Arizona.	3.	10. Dec 11.	Mar 16.	Apr 2.	J H Sayre.	330 Pine st.
ndle Fleece Gravel M Co.	California.	28.	30.00. Jan 27.	Feb 28.	Mar 19.	F R Schirmeier.	785 Folsom st.
reto M & M Co.	Mexico.	3.	15. Feb 6.	Mar 9.	Apr 9.	H G Jones.	327 Pine st.
ayflower Grav M M Co.	California.	10.	25. Jan 13.	Feb 12.	Mar 30.	J A Morton.	328 Montgomery st.
lones Con M Co.	California.	10.	2.50. Mar 7.	Apr 9.	May 1.	E M Hall.	310 Pine st.
nt Auburn G Q M Co.	California.	10.	25. Feb 7.	Mar 15.	Apr 2.	J H B Wilkins.	438 California st.
nik G & S M Co.	Alaska.	1.	15. Feb 16.	Mar 23.	Apr 10.	C Robinson.	339 Kearny st.
o M & M Co.	Arizona.	2.	10. Dec 28.	Mar 5.	Mar 29.	J L Fields.	309 Montgomery st.
ucky Point M Co.	California.	12.	05. Jan 22.	Feb 26.	Mar 16.	D M Kent.	330 Pine st.
o Pedro M Co.	Arizona.	8.	05. Mar 6.	Apr 10.	May 2.	H Deas.	309 Montgomery st.
uth Hite G M Co.	California.	5.	05. Jan 30.	Mar 8.	Mar 26.	F A Berlin.	420 Montgomery st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
ollar M Co.	Nevada.	W E Dean.	309 Montgomery st.	Annual.	Mar 21
lorado Con M Co.	Nevada.	F W Clute.	S F Stock Exchange.	Annual.	Mar 14
le & Norcross S M Co.	Nevada.	J F Lightner.	309 Montgomery st.	Annual.	Mar 14
newward Bound M Co.	Nevada.	H R Bowie.	420 Montgomery st.	Annual.	Mar 12
ones Con M Co.	California.	E M Hall.	310 Pine st.	Annual.	Mar 27
thern Belle M & M Co.	Nevada.	W E Dean.	330 Pine st.	Annual.	Mar 13
ost M Co.	Nevada.	W E Dean.	309 Montgomery st.	Annual.	Mar 20
gin A Con N Co.	Nevada.	A F Benard.	NE cor Howard & 5th.	Annual.	Mar 20

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
wer Con M Co.	California.	W Willis.	309 Montgomery st.	.05.	Mar 12
ntention Con M Co.	Arizona.	D C Bates.	309 Montgomery st.	.25.	Feb 17
ntuck M Co.	Nevada.	J W Pew.	310 Pine st.	.10.	Mar 19
rajo M Co.	Nevada.	J W Pew.	310 Pine st.	.25.	Mar 13
thern Belle M & M Co.	Nevada.	W E Dean.	330 Pine st.	.50.	Feb 15
asant Valley M Co.	California.	C E Elliot.	227 Pine st.	.25.	Feb 15
er King M Co.	Arizona.	J Nash.	315 California st.	.25.	Feb 15
ndard Con M Co.	California.	Wm Willis.	309 Montgomery st.	.25.	Mar 12

Recent Contributions to the California State Mining Bureau.

[CATALOOUE.]

4564. Selenite, Gypsum—Near Modesto, Stanislaus Co., California, L. Figueroa.
4565. Brown Stone, Freestone, (of which New York is largely built)—Coppercut, M. Haverin.
4566. Copper—Copper King Mine, Emeralds, Nevada.
4567. Wall Rocks of the Copper King Copper Mine—No. 4566, Emeralds County, Nevada.
4568. Gneiss, Borax, Eagle Borax Mining Co., Death Valley, Inyo County, California, D. Auer.
4569. Refined Borax—see No. 4563—Eagle Borax Co., Death Valley, Inyo County, California.
4570. Sesquioxide of Iron, Göttsche, (?), with Microscope slide this mineral is in beautiful hexagonal plates—Near Lamoine, Elko County, Nevada, Arthur T. George. A similar mineral is found at Pioche, Lincoln County, Nevada; see No. 4571.

THE STEAM PLOW.—A correspondent of the *Stockton Independent* gives this succinct report: I saw the steam plow work yesterday. Engines, two; distance apart, 460 yards; width of land plowed at each passage, four feet; number of plows used, eight; four used at a time; there should be five, making 10 in all, but two are being tempered; time of cutting a furrow, from four to five minutes; power of engines each, 40 horse; character of land, tough, black soil, salt grass growing; depth of furrow, six inches; every part of the machinery working well; cost of fuel, five dollars per day for both engines; capacity, from 40 to 60 acres per day in sandy soil. The writer is of the opinion that, with very few alterations on the plows, the machine will prove an immense success, and will supply a long-needed want for plowing land in California. Land plowed by this machine will produce at least one fourth more crop for a period of six or seven years than by the ordinary plowing in use in this State.

THE new charter for San Francisco was defeated at the election on Saturday.

FOR tremulousness, wakefulness, dizziness, and lack of energy, a most valuable remedy is Brown's Iron Pitters.

4672. *Selenite*, Gypsum—Calico, San Bernardino County, California, John Daggett.

4673. *Lava*—which exists in immense quantities on the borders of Mono Lake, Mono County, California, Owens River cuts through this formation in a deep canyon. It is easily decomposed and supposed to yield the Soda Salts so abundant in that region. It occurs also at Adobe Meadows, in Mono County. It is well worthy of a critical examination.

4674. *Vaiegated Obidian*—Near the South end of Goose Lake, Modoc County, California, F. H. Merrill.

4683. *Fluorite*, fluor spar with calcite—Cumberland, England, J. Z. Davis.

4684. *Selenite*, gypsum—Near Modesto, Stanislaus County, California, J. Z. Davis.

MISCELLANEOUS.—Amador *Ledger*, March 3: The Empire mine is adopting the Frue concentrators. Sixteen are to be placed in the 80-stamp mill. The satisfactory results obtained from those in operation at the Pacific mill, have led to their adoption at the Empire.

SEASON.—This mine pursues the even tenor of its way. It employs from 15 to 20 men, and distributes in wages and other expenses about \$3,000 per month. Mr. Symonds is superintendent, and seems to be running it very judiciously. The monthly yield has been sufficient, so far, to pay expenses, and the employees receive their money regularly every month. The mill has been kept running on rock from the tunnel, but it is probable that sinking will be undertaken in a short time.

BUNKER HILL.—The personal property under attachment was sold by the sheriff, last Saturday. It was sold to Mr. Haven, the representative of the company, for \$3,520, the amount of the judgments and costs. There are no attachments on the property now, except one for \$18,000, but this was put on by parties who are stockholders, and will give no trouble in getting the property out of the legal tangle in which it has become involved. The only incumbances now to be disposed of are the mechanic lien holders. A proposition was submitted by the company, that they will proceed to work the mine, and agree to pay the back wages in four monthly instalments, the first instalment to be paid April 1st, and the working expenses to be paid regularly every month. The employees held a meeting in the early part of the week, at Amador City, to consider the proposition. It is likely that the offer will be accepted, though perhaps in a somewhat modified form.

PARTIES are putting up a 10-stamp mill on the Loyal Lead property, in Black Hills, near Drytown, for the purpose of crushing rock from the old Loyal Lead tunnel. It is thought by those acquainted with the claim that this venture will pay.

THE Median mine, adjoining the Keystone, is likely to be started up this spring.

W. A. NEVILLS, on his trip to San Francisco last week, took down, so rumor says, from 70 to 80 pounds of bullion, the product of the bonanza in the Mammoth lead.

MR. GOODMAN is at Quartz Mountain, for the purpose of arranging to recommence operations on the Quartz Mountain mine.

MAHONEY.—The complications in which the affairs of this mine have become involved are still unsettled. H. H. Town, who went below to confer with the managers of the company, and also to make arrangements with creditors in the city, returned a few days ago, and reported favorably of the result of his trip. There appears no obstacle in the way of the working of the mine as far as parties below are concerned. The creditors here, however, seem to be a little disappointed on being notified by Mr. Stewart, the superintendent, that he will want something to say in regard to the manner in which the mine shall be worked. The employees have filed liens to the number of over 60; but this will not necessarily invalidate the continued idleness of the mine. It is understood the intention is to have the necessary legal proceedings between the company's agent and the creditors, with a view to the immediate resumption of work. Judgment was obtained last Saturday against the company for nearly \$10,000.

BUTTE.

HYDRAULIC MINES.—Oroville *Register*, March 3: Some six or seven hydraulic mines are being worked below Oroville. There is but little fall to the ground, so it is quite difficult to run off the claims. About 20 men are employed in the various tailings, and 1,000 inches of water is used. The most important mine is that known as the J. M. Frost mine. This employs 5 men and uses 400 inches of water. In order to raise the gravel from the bottom of the mine a new patent elevator is used.

CALAVÉRAS.

WORK PROGRESSING. — Calaveras *Chronicle*, March 3: Work is progressing favorably in the Anglo Saxon mine—formerly known as the Beaver mine—situated about three quarters of a mile southeast of Rich Gulch Flat. A shaft has been sunk on the lead to a depth of 100 ft, at which point a level has been run 60 ft in length, displaying a fine body of ore. A small quantity of unsorted rock was taken out and sent to San Francisco, where it was assayed, and yielded at the rate of \$150 per ton. The mine paid well in former years; the lead is wide and well developed, and the rock carries considerable free gold. The mine is under the superintendence of J. W. Meyers, Esq., a gentleman who thoroughly understands his business, and there is not the least doubt but that under his regime the Anglo Saxon will develop into a permanent paying property.

WESSON MINE.—The work of clearing out the tunnel on the Wesson mine, situated about a mile from this place, is progressing finely. The tunnel, which was badly caved in some places is being cleared of its debris and retimbered, preparatory to further developments.

EL DORADO.—*Mountain Democrat*, March 3: Superintendent Fred, Jones, at the new mill he has recently erected near Shingle Springs, recently crushed about 15 tons of ore from the claim of Bosquist, Honx & Gray, and the yield amounted to about 590 per ton. They have about 40 tons of ore somewhat inferior to this that they will have Jones crush next week.

PROSPECTING.—Georgetown *Gazette*, March 3: During the winter Robert Cushman and son have been prospecting some deep gulch ground a short distance to the north of their residence, meeting with flattering prospects. A few days since, they began sluicing, and it is thought they have a good claim. We hope this is so, for Mr. Cushman is deserving of a rich find.

A FEW days since Watson & Keefer shipped several hundred pounds of copper ore from their mine near Garden Valley to San Francisco, for further test of its value. Smaller quantities of this ore, previously assayed by Prof. Thos. Price, gave results highly satisfactory. That the ore just shipped is equally as rich in copper, silver and gold, no one acquainted with the ore will have any doubts; and further, should the present test prove anywhere near the former assays, it will demonstrate to a certainty that this mine is a valuable property, for the reason that the lode is large and continuous.

THE ditches of the California W. & M. Co. are now running to their full capacity, and we believe all the water is being used by our miners. Mining interests appear to be more active this spring than usual. A new life has taken hold of our people. The severest spell of "hard times" ever experienced on this divide during the winter just ended, seems now about to yield to a season of more than usual prosperity. In addition to the mines already under heading, we hear of quite a number of important mining enterprises which will be started up during the present season, on this divide. Among these may be named the Eureka and Woodside, in this place.

MILF KNOX evidently has struck good diggings; he has started in with 40 inches of water.

BALLARD & WARREN have started up the Gopherhole mine in this place.

GEO. HANBY is engaged in getting out chrome ore, on the serpentine belt southeast of town.

SINCE the thaw, work has been resumed on the Bob Redd mine in full force, and they are taking out specimen ore rich as ever.

SMEDER & FORNI are pushing their tunnel night and day. They have already cut a stringer which prospects well, and expect to tap the main lode some time this month.

S. HANSON, after being shut down for so long a time by the cold snaps of the winter, has started up the old Parsons mine and mill in good style, and we confidently expect that he will take out big pay this summer.

BILL LANE has a seam claim below town, from which he has been obtaining prospects sufficient to induce him to have it worked, and John Bennett has consented to take hold with him and work the mine. Bill has faith in the mines, and well he may, for it's the mines that keeps our business men on their legs.

FRESNO.

GERTRUDE.—Cor. Mariposa *Herald*, Mar. 3: This camp at present is quiet. The Enterprise mine and mill suspended operations two weeks ago, which, in consequence, makes this place very dull. I learn from reliable authority, that the suspension of the Enterprise mine is only temporary; that the mine is looking as well to-day as it ever did, but that the formation—slate—has become so hard and expensive to work that the company desired to suspend operations until arrangements could be made to obtain machinery that will enable them to work it to better advantage and at less expense. Operations will undoubtedly be commenced at an early day—at least we all hope so.

NEILS. ESTERSON has just uncovered a rich chute of ore in his Fresno mine, situated on Potter Ridge, near the Enterprise mine. The ore taken out so far is fully as rich as any ever taken from the famous Enterprise. The vein or ledge is rather small on top, but it increases in width as it goes down.

THE McDonald Bro.'s mine, at Grub Guleh, is still idle, waiting for rain, so they can start their mill. I understand they are making arrangements to bring in water from the Fresno river, which will give them abundance of water. Water is the only thing lacking to make this one of the best bullion producers on the coast.

CAPT. HARRY BERRIMAN is engaged in taking out some very rich ore from his Wellington mine, and will doubtless realize good profits therefrom.

NEVADA.

MT. AUBURN MINE.—Nevada *Transcript*, Mar. 3: Affairs at the Mt. Auburn mine are getting along nicely under the superintendence of that veteran gold digger, Capt. White. From 12 to 14 hands are constantly employed, and about 18 tons of ore per day is the output. This comes from the 360 and 460 levels, the latter being in much the richer ground. For a new property the Mt. Auburn shows up splendidly, but like any other, it must be thoroughly developed before it can be expected to pay dividends to its owners.

A GOOD PROSPECT.—The McCutcheon mine is now under the management of Charles H. Crosby, and the work on it is progressing finely. An incline is being run down, and the rock continues to look first class. A gentleman who visited the mine a few days ago informs us that he believes within six months the new company will take out, over and above all expenses, the amount that was paid, and have the claim. The price paid for the mine was \$10,000.

PLUMAS.

GREEN MOUNTAIN MINE.—Greenville *Bulletin*, March 4: The mills of the Green Mountain mine were forced to stop on Wednesday evening of last week, the water supply being exhausted. At the present face of the drift in the tunnel there is a heavy down-pour of water; while this is very unpleasant for the workmen, yet it does not occasion any loss of time. It is expected that when the tunnel is advanced a little further, this water streak will be left behind and the ground again become dry. Immediately after the mills were stopped, it was inferred that all of the machinery must stop, but this was a mistake; enough water has been supplied to furnish power for running the air compressor so that work in the tunnel has not been interrupted; the ventilating fan is in operation, and the work is going on more rapidly than before.

MICHIGAN HILL.—Robert Martin was over yesterday from Michigan Hill after a lot of iron bands made at the foundry here for the water pipe at his hydraulic claim. These bands are to prevent the pipe coming apart at the joints; the pressure is 200 ft head, and even in this dry season Mr. Martin is confident of having water enough for a four months run; the supply is brought from the mountain on the north side of Spanish Creek, the pipe being carried across the creek on a bridge built for that purpose. The partners own 120 acres of mining ground all of which was prospected before the present pre-

parations for working it were begun. Years ago the late ravines on Michigan Hill were worked by the old method of rockers, and a great deal of gold taken out, with the improved appliances of the present owners of the ground the prospect is good that they will be successful.

TAYLOR-PLUMAS MINE.—Like most of the other mills around, the mill of the Taylor-Plumas is still idle for want of water; in the mine most of the work lately done has been confined to the winze; the drift here has been steadily pushed eastward with good prospects as the work advances. A few hands were put to work last week in the face of the main tunnel, the ground here gives indications of becoming softer, and according to the usual experience the ledge may be expected to widen out.

INDIAN VALLEY MINE.—The Indian Valley mine is running steadily by steam power; an addition of 12 miners was made to the working force this week.

SAN BERNARDINO.

PROVIDENCE MINES. San Bernardino *Times*, Feb. 24: As I wrote you in a former letter, the bullion output for the month of January, from the Bonanza King Con. mill, was over \$61,000, and in all probability it would equal it this month. There has been already run 15 bars, value over \$23,000, with sufficient amalgam in the mill to run 10 bars more of equal value. Although it is likely that the mill will not make over 23 days on Bonanza King ore this month, it will probably reach the last month's production of 31 days. No 10-stamp dry crushing mill on the slope has shown such results, and the company are to be congratulated on having such an able metallurgist as Mr. E. Huhn; not only has the percentage run very high (over 80%) but the fineness of the bullion is seldom equaled (with the same class of ore), averaging over 930 fine for the past week.

THE BELLE MCGILROY MINE.—Had something like 25 tons of ore worked by the Bonanza Con. this month. It is said to have run up in the hundreds. The owners, Messrs. Dwyer & Gorman, have already refused \$50,000 for their mine. They are pushing their works down with large showings of fine mineral.

MR. R. P. KERR is opening his mine north of the Bonanza King, which is showing up a considerable quantity of high grade ore. There are now sunk two shafts, one some 50 ft, and the other about 25 ft with several openings along the ledge. In drifting from the bottom of one of the shafts he is taking out some high grade ore, with fine prospects ahead.

THE LUCKNOW MINE, south of the Belle McGilroy, were shown several assays running in the neighborhood of \$700 per ton. The owners have run across a ledge of about 10 ft, carrying mineral the full width. There are several other small openings on this claim making a nice showing of mineral.

A NEW STRIKE was made during the past week, between the Bonanza King and Rattler. The shaft is now down some 12 ft, with every prospect of a fine body of ore. The company, also, in sinking a winze in the south end of the mine, struck another body of fine mineral, taking out 49 sacks of ore in one day, assaying over \$750 per ton.

MR. J. K. PATTON, of this place, has purchased from Messrs. Kenniston, Brazelton & Folks one of their stages, with six of their best animals, and will in the future run from here to the end of the track, so that all parties coming to this place can jump on the cars and be here in a few days without any inconvenience. Good miners will find employment, wages \$4 per day.

SIERRA.

THE SIERRA BUTTES MINE.—Sierra County *Tribune*, Feb. 29: At the Sierra Buttes mine a vast amount of dead work is being done at present. Number 9 tunnel is in a distance of 2,200 ft. The company have had some very hard rock to contend against in this tunnel, which has made the expense of running it greater than was anticipated. An outlay of a great many thousand dollars will be required before any benefit can be derived from this part of the mine, and no doubt many smaller companies would fail to carry out such an immense amount of work as is laid out to be accomplished by this company during the coming three or four years. The Sierra Buttes mine is a standing advertisement for Sierra County. The successful working of a mine to such a great depth as will be reached on this ledge when the lower tunnel is in, will prove of almost an incalculable benefit to the quartz mining interests of our county.

MR. SHAW, General Manager of the Marguerite property, says that the mine is looking splendidly, and from the present outlook will yield largely the coming year. The 20-stamp mill is running regularly. The appearance of the plates indicate that the ore is paying well.

Good gravel is still found in the Ruhy mine. Some of the workmen will be discharged until room is made in the new breasts that are being opened out.

J. BURNHAM, Superintendent of the American Hill mine, who was in town Sunday, says that the snow will average three feet in depth on the ridges. Water has commenced to run and the monitors were put to work on the 22d inst.

THE report comes from Howland Flat that there is every indication of the miners having 60 or 70 days' water season in that section.

THEODORE WARE & Co., cleaned up over \$200 last week, in their placer mine at the Sweetwater ranch, on the North Fork.

A. L. MURPHY is working the old Atwood mining claims in Rattlesnake Canyon, and is doing well.

HEAVY EXPENDITURE.—The total amount expended in prospecting the Bald Mountain Extension mine, located at Forest City, up to this date, is about \$89,000. Of this sum, \$59,000 has been paid in assessments. This is a pretty heavy drain on the owners, who are principally men of moderate means. However, they have an abundance of grit, and confidence in the value of the property, and believe that pay dirt will be encountered again in a short time.

TRINITY.

TOO NICE.—*Journal*, March 3: If you don't believe there is such a thing as too much of a good thing, just interview some of our hydraulic miners as to their views regarding the present extremely pleasant weather. Unquestionably, pleasant weather is a good thing, but it is just as certain that we are having altogether too much of it for miners' use. Snow, rain, slish and mud would be infinitely preferable now to sunshine and dusty streets.

TUOLUMNE.

PROSPECT.—Tuolumne *Independent*, Dr. Congdon, of San Francisco, has struck a very fair prospect on Phil Stoner's Webster claim, and present indications are that a large pocket will be taken out. A shaft about 8 ft from the surface has been sunk. The rock thus far is well charged with fine gold—and the last work done, very coarse gold is coming in. This is a parallel ledge to the Webster, and Stoner has made arrangements with the doctor to work this partierth claim on shares.

Nevada.

WASHOE DISTRICT.

OPHIR.—*Enterprise*, March 3: The station in the joint Mexican winze is completed, and the guides are all in place for the second line of hoisting cages. These cages will be in operation and an east cross-cut started from the 3100 station about Monday.

MEXICAN.—The work of putting guides into the second hoisting compartment of the joint Ophir winze from the 2900 down to the 3100 level is completed.

HALE & NORCROSS.—The north drift of the 2600 level, joint with Savage, is making good progress. Some seams of quartz are beginning to appear; but, as yet, they carry little ore.

YELLOW JACKET.—Are shipping about 70 tons of ore per day.

GOULD & CURRY.—The west crosscut on the 2300 level is making rapid progress in vein porphyry, with occasional small seams of clay and quartz.

CALIFORNIA.—On the 2000 level the main south drift is being advanced at the rate of about 20 ft per week.

SIERRA NEVADA.—The east crosscut on the 2700 level still continues in the cross course or cross vein. The joint Union Con. east crosscut on the 2900 level is still in a compact vein porphyry.

UNION CON.—The joint Sierra Nevada east crosscut on the 2900 level is still being advanced in compact vein porphyry. The joint Mexican east crosscut on the same level is cutting occasional stringers of metal-bearing quartz.

PINTO DISTRICT.

The main incline at the Fair Play mine on Alhambra Hill in down 140 ft, with a fine ledge formation of quartz and lime, containing all grades of ore at the bottom from 15 to 20 ft thick. The Sparrow mine is a new prospect that is being opened with good indications. The croppings are plainly traceable upon the surface for a distance of 300 ft. A shaft down 30 ft on a fissure shows a galena in excellent ledge matter, and promises to make into a strong ledge. The lessees of the Silver Nugget mine are taking out some very fine ore and getting ready for a shipment. The Berryman Bros. are cleaning out the old ore chambers in the Diagonal mine on Silverado mountain, and will ship a fine lot of quartz to the furnaces as flux. This will average about \$50 per ton. The main shaft at the Western Globe on Silverado mountain is now down 120 ft from the surface and 60 ft below the tunnel level.

Colorado.

DIVES AND PELICAN.—Colorado *Miner*, Feb. 20: On Tuesday our reporter paid a hurried trip to this property. The ore is not high grade, but occurs in such vast quantities that if it can be made to net even \$10 a ton, which is a very low estimate, the thousands of tons ready to be shot down will yield a fine revenue. To confirm tests recently made, Supt. Duff this week shipped two car-loads, 20 tons, to Mr. Stevens' concentrating works at Lawson. The result we hope to announce next week. In the level below, 180 ft from the immense engine chamber, a stope is being started east of the shaft. Large ore bodies are exposed there, also. The best ore, however, at present is coming from the Unicorn, where Curtin and Reynolds in level No. 1, above the tunnel level, and Kennedy and company in level 2½, 200 ft below, are taking out considerable quantities of ore running from 100 to 400 ounces per ton. A drift on the Eagle Bird has been started west of the tunnel to intersect the drift on the same lode heretofore run through a cross-cut south from the main Pelican lode. It will have to be driven 300 ft before connection is made. Meanwhile the new drift will be chambered out immediately west of the tunnel and an engine put up with which sinking on the Eagle Bird will be pushed as rapidly as possible. This lode has produced largely in the past, and the best mining experience justifies the conviction that large bodies of rich ore are awaiting below for hammer and drill to expose them. The engine on the Perdue shaft works admirably raising the iron skip, lowering and stopping it at any desired point with the precision of clockwork. Forty-eight men are employed by the Dives and Pelican company, on company account and as leasers.

MINING AND MILLING.—*Register-Call*, March 3: A party of Chinamen—miners—left Central yesterday, with a view of effecting a lease of the placer claims on South Boulder creek, below the placer patent of the Rollins G. M. Co., worked last season by Lemmen & Co. Another party is trying to effect a lease of a placer claim on North Beaver creek.

ORE was being raised, yesterday, from the Foote & Simmons mine, on Gregory mountain. The recent purchaser of the property, Mr. Maud, will bend every energy to its development in a systematic manner.

THE United Gregory M. Co., have succeeded in lowering the water in No. 2, or the pump shaft, on the Gregory lode, to a point 65 ft below the surface. This is the first time in seven weeks that the water has been lowered to that point. The pump since being rearranged and remodeled, is working splendidly, and no fears are now entertained of any mishap occurring again through defective portions of the pump—Cornish pattern—one of the largest in use in the State of Colorado.

MESSRS. MULLEN & SATORI, contractors of this city, have taken the contract for the placement of the new and powerful plant of machinery on the Champion mine, Bellevue mountain, for the Donaldson Con. M. Co. They are also putting up an endless bucket-way from their mines to the mill and concentration works, which will be used for transmitting ore. This is a new feature in this part of Colorado for transporting ore.

SEVERAL nice gold retorts could have been seen

this morning on the cash table of Hanington & Melior's bank, in this city.

THE stamp mills of Black Hawk are well supplied with custom ore. The Empire mill is chock full, and ore piled outside awaiting crushing. The California mine company have added a portion of the Hidden Treasure mill to their stamping capacity, and the California mine, on Quartz hill, operated by them, is in as good pay at the present time as at any former period in its history. The output of the California for 1882, taking as a basis its monthly output so far, will reach fully \$300,000 in milling and smelting ore.

OWENS & JENKINS, last Saturday, shipped a quantity of ore from their new silver discovery west of the city.

SEVERAL of the gulch miners below Black Hawk are preparing to resume placer mining as early as possible in the spring. Dams have been constructed, ditches repaired, and other necessary preparations made for an active season's work.

New Mexico.

LAKE VALLEY.—*Herald*, March 3: Sinking is being done upon nearly 20 claims on Kentuck mountain, and all are giving good promise and yielding excellent assays. It is the remark of every body who examines this district, that nowhere has there ever been so high an average in the grade of ore, and so general a distribution. Mr. Dawson reports the shaft on the Comstock down 25 ft through the iron, and the crevice filled with fine quartz. This is one of the most promising claims at present. A gentleman examining our mines asked if there had been any claim jumping. On being answered no, he remarked it was probably because there was mineral everywhere, and it is not worth while to jump, any more than it is a necessity. Orders have been received to survey, for patents, the Bullion and Last Chance, and also the Little Jimmie, the former have precedence as to time. Mr. S. K. Bradford has been engaged to survey all three of them. This will bring the disputed title to settlement by proof before the Register of the land office. The policy of the Superior company is slow and sure. When development actually shows how much ore they have at hand it will be determined as to what kind of works will be necessary, and to what extent. It is of no use to be impatient. When they do decide everything will go positively and rapidly. There will be no embarrassments, no delays. Frazier, Holt & Cosgrove are now sinking a shaft upon the Savage, which lies parallel with the Superior, and which was located at the same time. It is upon the same line belt and is in contact with the porphyry upon the east of it. The line is filled with seams or veins of mineral, and it is on one of these they are now sinking, not far from No. 7 working of the Superior. The net returns from the last carload of ore shipped from the Bullion mine, to Denver amounted to \$6,170 for a little more than 10 tons. It was sufficient to pay all the working expenses of the mine for the last three months, and leave a balance of \$2,000 in the treasury. The next carload will soon be ready and the mine is yielding rapidly of high grade ore. It is a property which it is a pleasure to own.

Oregon.

NOTES.—Jacksonville *Times*, March 2: Miners of Josephine county are busy, being more favored with water than those here. Gin Lin seems to be the only miner in Uniontown precinct who has an abundance of water. Many of the miners are busy, but some have no water at all. The mining season does not promise well. Miners who have reservoirs are in better luck than ever this season, for without them they could not run at all. Goldworthy & Justus are opening the main bed of Foots creek, which enterprise will no doubt prove remunerative in time. The pleasant weather has greatly discouraged the miners, who will be unable to do much unless there is plenty of rain during the spring. The snow in the mountains is fast disappearing, much to the disgust of the miner, who looked to it as a source of supply in the late spring. The *American Mining Code*, the best work published, can be obtained at the TIMES office. Also blank notices of location of quartz and placer mines. Jas. Hansen returned from Josephine Tuesday. He informs us that Wimer & Sons are in possession of the big mine at Waldo, where operations are progressing steadily. Curtis Bros., who are engaged in pipping off the old tailings in Jackson creek, have been doing well, considering their opportunity. They took out about \$50 in one day last week. Mullen & Adams have commenced working the Rockfellow diggings this side of Ashland, and expect to make a good run. They use the water from the ditch that supplies the Ashland flouring mills until the 1st of July. Chas. Williams of Pleasant creek, who was in town this week, informs us that the once-prosperous mining camp has dwindled down to almost nothing, one white man and eight Chinamen constituting all the miners in that section. The Gold Hill M. Co. has employed Mr. Thomas, an experienced quartz miner, to prospect for the missing vein, which paid so enormously in days gone by. He had been engaged in repairing the old tunnel, which was in a dangerous condition. Bybee, Hawkett & Co. are running their claims near Waldo night and day, with good prospects. Snow fell to the depth of 3 ft at the head of the ditch and they will probably be able to run two pipes until the 1st of June, as they have excellent water privileges. A clean-up made after a few days' run yielded over \$300. Some of their ditches slid in, but the damage done is about repaired.

Montana.

LEXINGTON.—*Inter-Mountain*, March 2: For several days rumors have been afloat in this city of important developments in the Lexington mine. It was learned that, leaving out of consideration the ore recently developed on the 400 level, there is enough pay rock in sight in the mine to supply the mill for a period of two years and a half without any further exploration. On the 400 level an ore chute has been explored for a length of 120 ft, showing a body of ore of a uniform width of three feet, which samples 100 ozs. in silver from one end to the other. It is the richest silver ore chute in the district. The average ore production of the Lexington during the month of February was 55 tons. The average pulp assay from the mill was .48 ozs. in silver and .18 in gold. The output for the month (28 days) was over \$85,000, figuring silver at \$1.05.

Metallurgy of Nickel and of Copper.

The following paper on the "Metallurgy of Nickel and Copper" was read at a recent meeting of the American Institute of Mining Engineers, by W. E. C. Eustis and H. M. Howe, of Boston.

The processes which form the subject of this paper have been experimented on in the laboratory of W. E. C. Eustis, but have not passed beyond the experimental stage. The first is the invention of Mr. J. L. Thomson, of Capelton, Quebec, Canada, the others have been invented by the writers:

Thomson's Process for the Extraction of Nickel.

This consists essentially in first rendering the nickel magnetic, and then separating it from the materials with which it is mechanically mixed by means of a magnetic separator. In the case of oxidized compounds of nickel it would generally be desirable to bring the nickel to the metallic condition, in which it is most highly magnetic. The compounds of nickel with sulphur would probably, in the majority of cases, be most readily separated by bringing the nickel approximately into the state of sub-sulphide, in which condition it is also magnetic.

In most cases where nickel occurs with a considerable proportion of the heavy metals it would be best to effect the magnetic separation before fusing the material, since, on fusion, the nickel would enter into a chemical combination with the other metals present, as an alloy, matte, speise, or similar compound, from which, of course, the magnet could not separate it.

For cases where nickel occurs with a large proportion of iron, the following plan has been proposed by the writers: The either naturally or artificially oxidized compound of nickel is treated with a mixture of carbonic oxide and carbonic acid, or of other reducing and oxidizing gases, in such proportions that they are capable of reducing nickel so nearly to the metallic state as to render it magnetic, but still containing so much carbonic acid or other oxidizing gas as to be unable to reduce iron to that condition. It cannot be positively stated that it is possible in this way to render nickel magnetic without at the same time rendering iron magnetic, but experiments made by the writers render it probable that this can be effected. Having rendered the nickel magnetic, it can then be separated with the magnet from all matter with which it is mechanically mixed.

This method of reducing nickel with a mixture of gases not sufficiently reducing to render iron magnetic is an application of a general method patented by the writers.

Experiments tried with the nickel ores of Orford, Quebec, Canada, which contain a small portion of pure millerite, with calcite, pyroxene and chrome garnet, gave a concentrate containing over 60 per cent. of nickel. Cobalt would probably, in most cases, follow the nickel into the concentrate.

Magnetic Process for Sulphuretted Copper Ores.

The ores of the Crown mine, at Eustis, Quebec, Canada, contain chalcopryite, pyrite, marcasite and intermediate compounds, containing copper in every possible proportion from nothing to 30 per cent.; with these sulphuretted minerals is mixed a variable amount of silicious gangue. The writers found that, on burning these ores in heaps or in kilns, all the sulphuretted minerals became magnetic, so that, on making a magnetic separation, the whole of the copper passed into the concentrate, only a trace being found in the non-magnetic portion. Although the method is inapplicable to the Crown ores on account of the small amount of gangue which they contain, yet sulphuretted ores of copper might, in many cases, be thus treated advantageously if they contained much gangue.

The necessity of first pulverizing the burnt ore is a drawback to this as to all other methods of concentration, since the difficulty of any subsequent fusion is, of course, greatly increased by the fine state of division of the ore; it places, however, the concentrate in an excellent state for treatment in the wet way. The consumption of power in pulverizing a burnt ore is very much smaller than in pulverizing the same ore when raw, which is so much to the advantage of the magnetic separation as compared with the ordinary mechanical separation.

The following obvious extension of the above mentioned principle is proposed by the writers: Any metal existing in chemical combination with any oxide or sulphide of iron, or nickel, or cobalt, or with any other combination of either of those metals capable of being rendered magnetic, can be separated by the magnet from all gangue and other materials with which it is mixed, excepting such materials as would necessarily be rendered magnetic by the treatment which renders magnetic the metal which is sought.

The separation of gold-bearing pyrites from quartz and other gangues might sometimes be advantageously effected in this way.

Electrolytic Method for Separating Nickel and Other Metals.

This process consists essentially in the precipitation of nickel and other metals from their molten slags, on bars of iron or other metal inserted in the slag. The process of Rivot and Philipps precipitates copper from its molten slags on iron bars. Our experiments prove that not only iron, but even copper, precipitates nickel from its fused silicates, and, conversely,

that neither nickel nor copper will precipitate iron from its slags, nor will nickel precipitate copper from cupreous slags.

In the experiments, an oxidized salt of the metal which we sought to precipitate was fused with silicates of iron and lime, and with nitre, or some other strongly oxidizing flux, to insure the complete oxidation of the metal before the attempt to precipitate it was made. After complete fusion, we inserted into the slag a bar of the metal on which it was proposed to precipitate the metal contained in the slag.

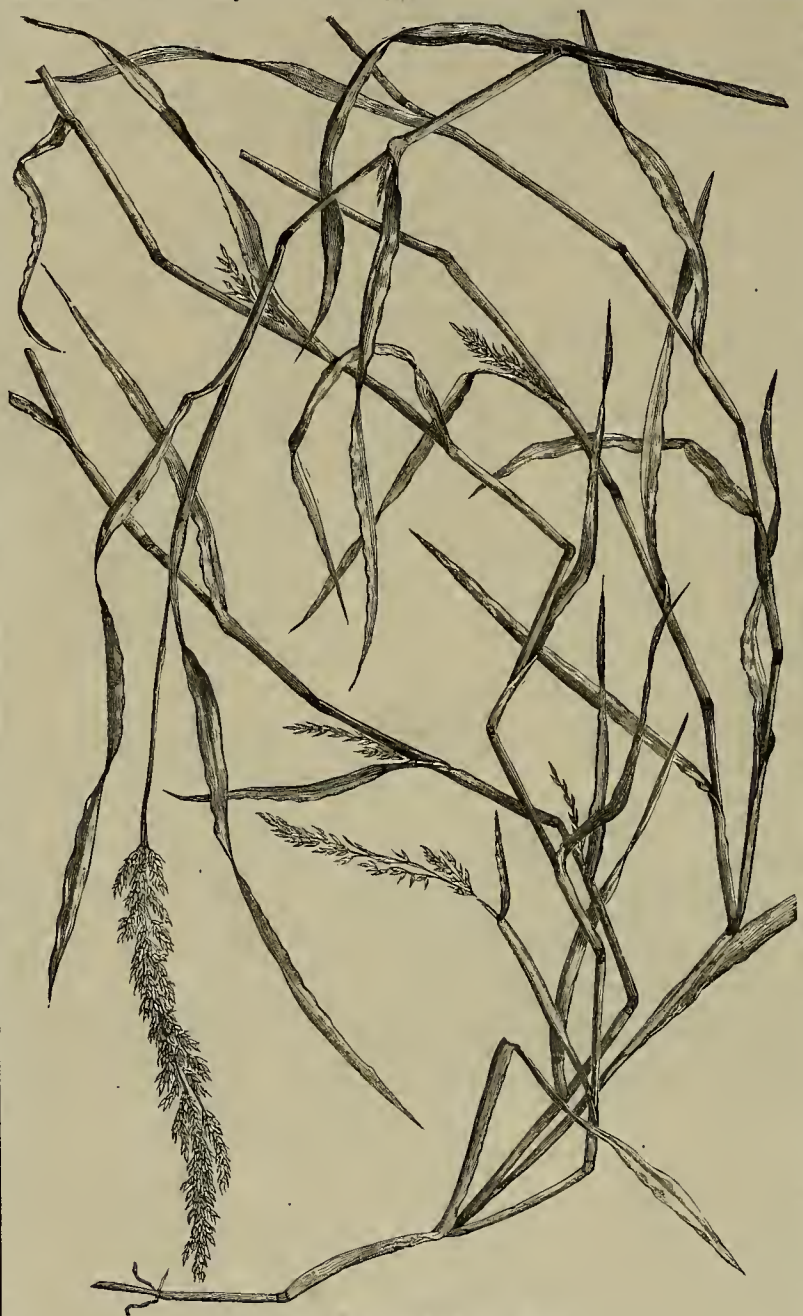
On suspending iron bars in nickel-bearing slag, they were rapidly coated with a beautiful covering of nickel, in many cases adhering tenaciously, and having a surface resembling Etruscan gold in texture. The nickel, as it is precipitated, would run down the sides of the bars and trickle from their ends, forming little buttons in the bottom of the crucible. These buttons contained considerable quantities of iron, although the iron bars were suspended some distance above them. From this it is to be inferred that the iron alloyed with the freshly

from the comparatively cool surface of contact between the copper and the slag, nickel did rapidly precipitate.

To make this precipitation of metals from their fused slags more thorough and rapid, we propose to pass a current of electricity through the slag while it lies melted on the hearth of a reverberatory, or other suitable furnace. The furnace bottom would be made the anode of the current, and the metallic bars inserted into the fused slag would act as cathodes. In many furnaces the bottom contains sufficient metallic matter to make a very efficient cathode, but a carbon bottom, such as has been used for the production of ferromanganese on the open hearth, would probably act much more efficiently.

The writers hope at another time to present to you further facts as to the relative positions of the metals on the scale of electropositeness at these high temperatures, and in slags of different compositions and different degrees of acidity.

BEVERIDGE DISTRICT.—The new five-stamp



WOOD GRASS.—*Muhlenbergia Mexicana*.

precipitated or nascent nickel while the latter was running down its sides. Whether it would be possible to precipitate nickel at so low a temperature that iron would not alloy with it, we cannot state; but that nickel is precipitated from its slags at temperatures considerably below its melting point is indicated by the following experiment: When copper bars were inserted in a metal nickel-bearing slag, the sides of the bars were rapidly coated with metallic nickel. Now, at the point of contact of the slag with the copper bars, the slag can have been but slightly above the melting point of copper, and therefore far below that of nickel; for the solid part of the copper bars cannot have been hotter than the melting point of copper. The melted layer of copper (if any) on the surface of the solid portion must have been very thin, as otherwise it would have trickled down the sides of the solid portion, and, being very thin, its outside surface can have been but little above the surface of the solid portion, which latter could not have been hotter than the melting point of copper; and, finally, the layer of slag which was in contact with the thin film of copper on the outside of the copper bars must have been but infinitesimally hotter than the surface of that melted copper. Nevertheless,

mill is being pushed to completion as fast as possible by Mr. L. Lasky, the owner. It is intended to have the mill in running order by March 15th, when crushing will be immediately commenced on ore from the Keynot and other mines contiguous to the mill. Rich quartz is now being extracted from a number of claims, and there is every prospect that plenty of ore will be produced to keep the mill in constant operation. Over \$350,000 in gold has already been taken out in the past two years, and that mostly from the Keynot mine alone, which has large quantities of ore yet in sight, but some dead work will have to be done before any considerable quantity of ore can be taken out. Several other promising claims in this district have not yet been worked to any considerable extent, but some of them promise to yield largely when opened. Beveridge will be a busy camp during the coming summer.—*Inyo Independent*.

A BILL has been introduced into the Legislature requiring articles manufactured in the reformatory institutions or prisons of Pennsylvania to be distinctly branded and marked as articles of convict labor before being placed on the markets.

A Grass for Low Ground.

A grass for low moist land is sometimes wanted even in a dry State like California, and in suitable situations, perhaps, the grass shown on this page may be worthy of a trial. It is *Muhlenbergia Mexicana*, or "wood grass." It is a perennial grass of rather decumbent habit, two to three feet high, very much branched from scaly, creeping root stocks. The culm has numerous short joints below, which are frequently bent, and rooting near the base, and sending out many long, slender, leafy, lateral branches, which give rise from the joints and at the apex to the flowering panicles, which are sometimes partially included in the leaf sheaths. The leaves are three to four inches long, and two to three lines wide, gradually pointed. The panicles are narrow, usually two or three inches long, and composed of 5 to 10 spike-like branches, closely approximated or becoming distant and interrupted below. The spikelets are single-flowered, consisting of a pair of outer empty glumes, which are abruptly sharp-pointed, and nearly as long as the flowering glume, which is narrow, strongly three-nerved and acute, with usually a few soft hairs at the base and on the nerves. The palea is of equal length, with its glume also acute, but not bristle-pointed.

This grass is frequently found in moist woods and low meadows, or in prairie bogs. It probably would not endure open upland culture, but in its native situation it fills an important part among indigenous grasses.

Professor Killebrew says: It thrives best in bottoms, where it grows freely. It is slower in maturing than most grasses, and hence fills a vacuum caused by the seeding and dying out of the earlier grasses. It is eaten with avidity by cattle, and is a good grass in its place.

Elko County.

Its Mines Officially Reported.

H. V. Mundell who has been Assessor of Elko county for the past four years, furnished in accordance with the law, a report upon the physical and financial condition of the county. That portion of Mr. Mundell's referring to Elko county we give, as follows:

The condition and prospects of the mining interest of Elko county have materially brightened during the past year, and particularly in the Tuscarora Mining District. After the flush times that usually follow the discovery and early development of a new mining region, Tuscarora enjoyed a prosperity proportionally equal to that of any mining district in Nevada. The customary reaction succeeded; cessation of labor underground, closing of some of the principal mills, and a period of general dullness and inactivity; but during the past year a revival has changed much of this depression, and the tendency of things is now upward and onward. Unless some unexpected backset occurs to interrupt this progression, Tuscarora in 1883 will show a certificate of deposit, in the shape of solid silver bricks, that will remind one of its former days. This improvement, commencing last spring, has been steadily strengthened by the developments made during the past summer and fall. The indications are now good for a long period of steadily-increasing and permanent prosperity.

This improvement at Tuscarora has been of material advantage to other portions of Elko county, and incidentally to the State. Tuscarora receives most of its supplies of every sort from the railroad, at the depot at Elko, the county seat. There have not been teams enough at Elko during the fall to keep the depot clear of this northern freight; but fortunately the fall of 1882 was so open and mild that the roads were in condition for use much longer and later than usual. Lumber, coal, salt, grain, and general merchandise of every sort, have been piled up weeks at a time awaiting shipment. This, of course, added to the general value of assessable property in Elko county, increased the poll tax revenue, and has given a permanency to the values of every description, and indirectly increased the revenues of both State and county by a renewed local mercantile activity.

The principal producing mine at Tuscarora during the past two years, as shown by the reports of mining superintendents, has been the Navajo. The Navajo mine, under the management of W. C. Price, superintendents, has done considerable and expensive work, and the result shows the management has been done with good judgment. The Independence, Belle Isle and North Belle Isle, have produced moderately. The Grand Prize, John E. Dixon, superintendent, still makes a very fair showing, though not as great as in the days when it made the reputation of Tuscarora. The product during the past two years shows that this favorite mine is likely to long maintain its prestige. There has been considerable ore handled by outside or independent parties, among whom Whitney, Vesey & Co., Brown & Urton are prominent. The Central Consolidated has also done considerable work in developing its mine.

By vaporizing two quarts of tobacco juice over a slow fire, Baron Rothschild's gardener, at Paris, Monsieur Bozard, destroys all the troublesome insects that may be contained in the hot-house in which the operation is performed. He considers the remedy infallible, and says it rarely injures the tenderest plants,

THE ENGINEER.

USEFUL INFORMATION.

Facts for the Curious.

The greyhound runs by sight only, and this we observe as a fact. The carrier pigeon flies his 250 miles homeward by eyesight—namely, from point to point of objects which he has marked; but this is only our conjecture. The fierce dragon-fly, with 12,000 lenses in his eye, darts from angle to angle with the rapidity of a sword and as rapidly darts back; not turning in the air, but with a dash reversing the action of his four wings, and instantaneously calculating the distance of the objects, or he would dash himself to pieces. But in what conformation of the eye does this consist? No one can answer.

A cloud of 10,000 gnats dance up and down in the sun, the minutest interval between them, yet no one knocks another headlong upon the grass, or breaks a leg or a wing, long and delicate as these are. Suddenly, amidst your admiration of this dance, a peculiar high-shouldered vicious gnat, with long pendant nose, starts out of the rising and falling cloud, and settling on your cheek inserts a poisonous sting. What possessed the little wretch to do this? Did he smell blood in the mazy dance? No one knows.

A carriage comes suddenly upon a flock of geese on a narrow country road, and drives straight through the middle of them. A goose was never yet fairly run over, nor a duck. They are under the very wheels and hoofs, and yet they somehow contrive to flap and waddle off. Habitually stupid, insolent and heavy, they are nevertheless equal to any emergency.

Why does the lonely woodpecker, when he descends his tree and goes to drink, stop several times before he takes his draught? No one knows.

The power of judging of actual danger, and the free and easy boldness which results from it, are by no means uncommon. Many birds seem to have a most correct notion of a gun's range, and while scrupulously careful to keep beyond it, confine their care to this caution; the most obvious resource would be to fly right away out of sight and hearing, which they do not choose to do. And they sometimes appear to make even an ostentatious use of their power, fairly putting their wit and cleverness in antagonism to that of man, for the benefit of their fellows.

We lately read an account, by a naturalist in Brazil, of an expedition he made to one of the islands of the Amazon to shoot spoon-bills, ibises and other of the magnificent grollatorial birds which were most abundant there. His design was completely baffled, however, by a wretched little sandpiper that preceded him, continually uttering his tell-tale cry, which at once aroused all the birds within hearing. All day this individual bird continued his self-imposed duty of sentinel to others, effectually preventing the approach of the fowler to the game, yet managing to keep out of range of his gun.

How to Split a Sheet of Paper.

Many people who have not seen this done might think it impossible; yet it is not only possible, but extremely easy, as was explained in this paper several years ago, and recently described in the *British and Colonial Printer and Stationer*, which is as follows: Get a piece of plate glass, and place on it a sheet of paper; then let the latter be thoroughly soaked. With care and a little dexterity the sheet can be split by the top surface being removed. But the best plan is to paste a piece of cloth or strong paper to each side of the sheet to be split. When dry, violently, and without hesitation, pull the two pieces asunder, when part of the sheet will be found to have adhered to one, and part to the other. Soften the paste in water, and the pieces can be easily removed from the cloth. The process is generally demonstrated as a matter of curiosity, yet it can be utilized in various ways. If we want to paste in a scrap book a newspaper article printed on both sides of the paper, and possess only one copy, it is very convenient to know how to detach the one side from the other. The paper, when split, as may be imagined, is more transparent than it was before being subjected to the operation, and the printing ink somewhat duller; otherwise the two pieces present the appearance of the original, if again brought together. Some time ago, says the *Stationer*, the information of how to do this splitting was advertised to be sold for a considerable sum.

ARTIFICIAL SPICES.—A descendant of the Yankee who is credited with having produced that refinement of invention, the "wooden nutmeg," has, according to the *Madras Mail*, improved upon the example of his predecessor, and produced wooden cloves. That journal records the fact that several bags of cloves lately received in London from Zanzibar were found on arrival to contain artificial cloves neatly manufactured by machinery. They were made of soft deal, stained of a dark color, and soaked in a solution of essence of cloves to give them the requisite spicy odor. It is further added, that they were traced as having been imported from America into Zanzibar.

AN EXPERIMENT WITH SALT.—Do you want to grow salt, and, at the same time, have an interesting, handsome ornament? The proceeding is a novel chemical experiment that may be tried by any one. Put in a goblet one tablespoonful of salt and one tablespoonful of bluing; fill the goblet two thirds full of water and set in a position where it will have plenty of warmth and sunlight. In a little while sparkling crystals will commence forming on the outside of the glass, and it is both a novel and interesting sight to watch it gradually growing day by day, until the outside of the goblet is entirely covered over with beautiful white crystals. Another variation of this beautiful experiment would be to take a goblet with the base broken off and fasten it in the center of a thin piece of board, which may be round, square or oblong. After the crystals have formed on the glass, set it on a tiny wall bracket, and place a bright holiday or birthday card in front of it; this will hide the base, on which no crystals will form. After this is done, fill the goblet with flowers or dried grasses, and you will have a vase which will cost comparatively little, and in reality adds to the l'rie-a-brac of the room.

A NEW METHOD OF SILVERING MIRRORS. According to an exchange, the addition of glycerol to an ammoniacal solution of nitrate of silver produces a brown color, accompanied by a slowly-forming deposit of a black substance. The action is greatly accelerated by the application of heat, and a portion of the silver is deposited as a steel-gray mirror. If a few drops of potash solution are added to the mixture of glycerol and ammoniacal silver, a brilliant mirror is soon formed on the interior of the vessel. The phenomenon is even more striking if the ammoniacal silver solution be first mixed with potash, and glycerol then added; directly the glycerol comes in contact with the silver solution, reduction takes place with formation of a brilliant metallic mirror. If ether is added to the mixture of glycerol, potash and ammoniacal silver nitrate as soon as it touches the aqueous liquid, a metallic ring is formed at the junction of the two liquids, and in a few seconds reduction is complete through the whole bulk of liquid. If alcohol is added to the glycerol-silver mixture, reduction is somewhat accelerated and the metallic mirror is always brilliant. The results of these experiments show that the reducing action of glycerol on silver salts may be applied technically with advantage to silvering mirrors, both from the facility with which the process may be conducted and from its economy.

DANGEROUS BILLIARD BALLS.—In Heidelberg the other day, says an exchange, a man was holding a lighted cigar and a celluloid billiard ball in the same hand, and the two coming in contact, the outer shell of the ball exploded. He burned his hand a little before he was able to drop the ball.

GOOD HEALTH.

Fruit Juices.

There is often a decided objection to the use of our coarsest fruits, especially in sickness, or when the stomach or bowels may be in a sensitive state, on account of the irritation of the angular and sharp seeds, and peel or skin. Like the hull of the wheat—or hulls, as there are five different layers, which should be removed, in most if not all cases, from the flour—these seeds and rinds are often sources of irritation to the sensitive coats of the stomach, causing many forms of disease, particularly in the hot weather. It is exceedingly fortunate that these juices do not require digestion like the solids; but, like water, enter the system unchanged, there to be assimilated, of course, affording nutrition, with no use of the digestive apparatus, or but slight effort, that of absorption. (If desirable these juices may be prepared at this season, thoroughly scalded, canned like fruit, kept from the air and in a cool place, and used in the following spring, when such are exceedingly valuable, especially for those having debilitated digestion.)

It is very plain that if they demand no digestion, still containing all of the nourishment of the berry, securing rest for the stomach, the dyspeptic, etc., may well use this juice as a substitute for solids, for such a part of the time as will allow rest, time for the digestive organs to recuperate and become sufficiently strong to perform their usual amount of labor.

I will here remark that their use all the time, instead of at the last meal, or when the appetite may be particularly imperfect, would tend to debilitate the stomach, since, like all unused organs, the time would come when it would lose the power of action. As a general principle, the substitution of these for solids for one or two meals at most, using the simplest form of solids, as the raw egg or boiled rice, would be as much as would be advisable, save in extreme cases, when such nourishment for a week or less would be a choice of evils.

Milk should not be regarded as of this class, since it is solidified before digestion. It is not a proper drink between meals, since it requires digestion like solids. When there is much feverishness, with some appetite, the more acid juices, like that of the strawberry or the currant, may prove of great value without sugar, for that is a "heater." These tend to reduce

feverishness, though, if too acid, they may irritate the stomach, producing the canker.

The fresh juice of an apple—not fermented juice, or cider—is very appropriate and useful, the apple containing more nourishment than the potato. These juices may be used with great propriety when the appetite seems waning, or when but little food is indicated, for nourishment is obtained without labor.—*Golden Rule.*

Fat and Lean.

A little reflection will enable one to see that as the causes of these opposite conditions are as unlike as possible, so must be the treatment. To reduce flesh we have simply to reduce the quantity and quality of the food consumed, and when this is done judiciously, the general health of the patient is more likely to be improved than impaired. But were a lean man to attempt to increase his weight by gorging himself with rich food, he would soon find his object defeated, and himself a dyspeptic, and more emaciated than ever. We cannot force the body to receive and assimilate more food than it requires; but there is often a way to increase its requirements, and be thus safely increased the weight of the body, and the general health. A serious obstacle has frequently to be encountered from the fact that lean persons are usually nervous and restless; and these are conditions unfavorable to increase of flesh. This is true of all animals; when it is desired to fatten an animal his range is confined to narrow limits; the food given him is nutritious rather than bulky; he has comfortable quarters, and sleep and quiet are encouraged. Men are animals, and the same general rules, for the same purpose will apply to them, provided the general health is good. Lazy persons are seldom thin. If, however, emaciation depends on ill health, a different treatment is required. Instead of quiet the patient must have regular exercise in the open air; horse-back riding if possible, and whatever else that promises improvement of the general health; when emaciation is the result of disease of the lungs, if not too far advanced, this treatment, steadily pursued, often results in permanent cure. Indeed many physicians can refer to persons thus restored to health, who were at one time supposed to be incurable. It has been claimed—and it is probably true—that fresh rich milk is the best of all foods for producing fat. It is true that if a person who is inclined to be fleshy eats bread and milk regularly every day, and particularly in the evening, he will soon assume Aldermanic proportions. Milk is the natural food of man. It is nutritious, and not so liable as other foods to impair digestion.

Sometimes one's mental condition has more to do with bodily health than anything else. As a rule, fat persons are jolly and laughter-loving. Lean people are more often fretful, and have their eyes too steadily fixed on the dark side of every problem. If possible cease to fret and strive to "laugh and grow fat."

CANNED POISON.—Canned fruits, vegetables, meats, fish, soup, even canned puddings, says the *New York Herald*, are now not uncommon articles of diet, and we believe the introduction of these alimentary substances has been, upon the whole, a great benefit to the people; for fruit, vegetables and meat even, that at one season of the year would go to waste through the plenty that made them superfluous, are by the canning system economized for use in other seasons. But it is certain that several articles now put in tins should be put up in glass or earthenware to make them safe articles of diet. All substances that contain acids capable of attacking the solder or tin of the cans combine with these metals to make poisonous compounds, and may cause illness and even death.

ANTISEPTIC PROPERTIES OF PEAT.—Dr. Neuber, at a late Congress of German Surgeons, spoke highly of the antiseptic virtue of peat, or black earth, which is filled into bags made of loose gauze and laid over wounds. The bags are held in place by bandages of the same material. There seems to be little or no necessity to change the dressing. All secretions are rapidly absorbed by the earth or turf, and the healing proceeds very rapidly.

SMALL-POX seems to be getting the upper hand of the authorities at Leadville. Public schools are closed, a new pest house is being built, and the alarm is becoming general, and also reaching out into the surrounding towns. Some of them are establishing quarantine. The Denver authorities are using every precaution to prevent its appearance there, and have been successful thus far.

A MAN near Anaheim was taken very ill, and desired an allopathic physician. Though he was in his own house, a family living with him preferred a homeopathic, and when the old-school doctor arrived they drove him away with threats. He appealed to the Court for redress, and the Judge decided that a sick man has an inalienable right to select the physician he prefers.

EARACHE.—The treatment of earache depends entirely upon its cause. It may be due to functional trouble, like indigestion, liver derangement, splenic disorder, etc. It may be due to nervous disease. When chronic, good medical advice should be sought. The ear is too delicate and a too important organ to be neglected or trifled with.

THE GREAT BRIDGE OF INDIA. It is thought that of all the bridges in India the Attock bridge, when completed, will stand second to none. It will consist of five spans, two of 308 feet each, and three of 257 feet each, and will be entirely of iron. The material for the spans and for the piers was made and shipped by English firms. The third pier that stands in the middle of the river, and is exposed to all the violence of floods; will be protected by a massive cutwater about 100 feet high. It has also been proposed to protect the remaining piers by cutwaters, recent floods having shown the advisability of such a course. The bridge is reported to be making rapid progress toward completion, and it is thought that at the latest another year will see it in working order. The ironwork of the first two spans is now completed, and the staging for the third and fifth spans is progressing favorably.

THE RESPONSIBILITIES OF AN ENGINEER.—An engineer who tries to understand his business must study much; he must be above the common laborer or mill operative, and in fact above the head bookkeeper and confidential clerk in point of education,—he must have a clear head, a steady hand, and a brave heart, they have nothing strange or new to contend with; their paths are well beaten and plain; but with the engineer, how is it? He has that subtle thing, fire, that powerful agent steam, to handle and control, and out of his own brains he must find many of their laws. Thence the emergencies that arise every day and the responsibility which he carries; he is his brother's keeper; he, by a very small mistake, may hurl hundreds into suffering and death,—and he must contend with all these subtle agencies and bear these awful responsibilities, and should be paid accordingly.

A SUCCESSFUL ENGINEERING FEAT.—A difficult feat of engineering was recently accomplished on the Pittsburgh and Western railroad. Several places along the line required the stoppage of trains before they could be adjusted to broad-gauge. One of these points was the Summit tunnel. Its bed was lowered nine feet without stopping a train. The work was accomplished by the excavation of the bed of the tunnel while the track was kept up by trestle-work. A row of blasts would be fixed ready for firing, and as soon as a train had passed through they would be touched off and the debris cleared up before the next train arrived. The track for the broad-gauge was laid nine feet below the narrow-gauge, and on Sunday cars were run in on the lower tracks and the trestle for the narrow-gauge knocked down and dragged out.

ANOTHER IMPORTANT CANAL.—There seems to be just now a general movement "all along the line" in the way of changing the face of nature for the more convenient arrangement of water ways for commercial traffic. The latest proposition is nothing less than the separation of England and Scotland by a waterway from the Solway Firth to the River Tyne. An engineer is at present working on the surveys, and estimates are promised for early publication. This canal would have a length of only 80 miles, or 20 miles less than the Suez. It would, of course, afford a very convenient short cut across the country for ocean steamers. Some 40 years ago a scheme of the same kind was talked of.

REMOVING SAND FROM RIVERS.—An engineer in Oregon has put into practical operation a plan recently proposed for removing sand from rivers. According to the *Inter-Ocean* he removed 22,000 cubic yards at a cost of \$1,000, while by dredging the cost would have been \$10,000. The process is to load a steamer by the stern, anchor her head up stream, and then let her turn her propeller. This loosens the sand, which is carried away by the current. A steamer in that way deepened the channel of the Columbia river 18 feet, by a width of 75 feet, in 20 minutes.

ANOTHER TUNNEL UNDER THE HUDSON is projected at New York, the tunnel to be used for railroad purposes and to be connected on the New York side with the proposed central underground railway, from the vicinity of the City Hall up to the Hudson railroad, at Fifty-fifth street. This tunnel will be double tracked and have a capacity for moving 5,000 passenger cars daily. The projectors evidently mean business.

A CHINESE BRIDGE.—China is ahead on bridges; the largest in the world being her structure at Lagang, over an arm of the China sea. It is five miles long, built entirely of stone, has 300 arches 70 feet high and a roadway 70 feet wide. The parapet is a balustrade, and each of the pillars, which are 75 feet apart, supports a pedestal on which is placed a lion, 21 feet long, made of one block of marble.

UNDERGROUND WIRES IN CHICAGO.—After the 1st of May, in Chicago, no person or corporation will be permitted to maintain or use any telegraph pole, telegraph wire or electric conductor in any street or alley of that city. Every great fire adds new emphasis to the cry of "Put the wires underground."



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W. B. EWER.

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TABLE OF CONTENTS.

EDITORIALS.—Saving Gold on Snake River; Distribution of Gold; Mine Timbering, No. 5, 161. Passing Events; Copper; New Portable Assay Furnace; The Mining Bureau, 168. Anderson's Stock Car, 169. Patents and Inventions; Notices of Recent Patents, 172.

ILLUSTRATIONS.—Cross Section of Gold Mine in North Carolina; Method of Forming Joints in Timbers for Mines, 161. Wood Grass—Muhlenbergia Mexicana, 166. Sectional Side Elevation of Anderson's Patent Stock Car; Plan and End Elevation of Anderson's Stock Car, 169.

CORRESPONDENCE.—Notes from Eureka, Nevada, 162.**MECHANICAL PROGRESS.**—Strength of Timber; Machinery and Labor; An Improved Horseshoe; A Walking Power for Street Cars; Cutting Slots in Iron Bars; Importance of Little Things; Power Absorbed by Brakes; How to Temper a Small Spring, 163.**SCIENTIFIC PROGRESS.**—Mr. Edison on Storage Batteries; Astronomical Distances; The Origin of Petroleum; Mineralogical Notes, 165.**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends and Bullion Shipments, 164.**MINING SUMMARY.**—From the various counties of California, Nevada, Colorado, Montana, New Mexico and Oregon, 164-5.**THE ENGINEER.**—The Great Bridge of India; The Responsibilities of an Engineer; A Successful Engineering Feat; Another Important Canal; Removing Sand from Rivers; A Chinese Bridge; Underground Wires in Chicago, 167.**USEFUL INFORMATION.**—Facts for the Curious; How to Split a Sheet of Paper; Artificial Spices; An Experiment with Salt; A New Method of Silvering Mirrors; Dangerous Billard Balls, 167.**GOOD HEALTH.**—Fruit Juices; Fat and Lean; Canned Poison; Antiseptic Properties of Fat; Earache, 167.**MISCELLANEOUS.**—Humboldt County Lumber Interest; San Bernardino Mines; Assessable Stock, 162. Metallurgy of Nickel and of Copper; A Grass for Low Ground; Elko County, 166.**NEWS IN BRIEF.**—On page 172 and other pages.

BUSINESS ANNOUNCEMENTS.

Unbreakable Lamps—Paine, Diehl Co., Philadelphia, Pa. Dividend Notice—Standard Con. M. Co., S. F. Dividend Notice—Kentuck Mining Co., S. F. Dividend Notice—Navajo Mining Co., S. F. Dividend Notice—Silver King Mining Co., S. F. Ores Wanted—Pacific Mining and Reducing Co., S. F. Shoes—F. H. Wilson, Baltimore, Md.

Passing Events.

Very little news of an important nature comes to us from the mining regions. Occasional "strikes" are recorded in mines that are being developed, but at this season of the year there is not much general prospecting being done. Within the next month, however, the prospectors will begin to stir out of their winter quarters and roam the hills again.

News comes of heavy storms on the Atlantic coast, but thus far fine weather seems to be the rule in California. A good heavy rain storm would be heartily welcome everywhere. It is feared now that the water season for the miners will be very light indeed, as there is such a small storage of snow in the mountains, and the farmers have been for some time complaining of the dry season.

From present appearances, our northern regions will receive more attention the coming season than ever before. Idaho, Montana and Alaska are each being looked to as new territory by many prospectors. The latter, in particular, perhaps because it is furthest off, seems to possess many attractions to the nomadic miner, who is always looking for better diggings.

In the cases of the North Noonday Mining Co., the Noonday Mining Co., and the Red Cloud Con. Mining Co., insolvent debtors, Irwin C. Stump has been appointed assignee, with bonds fixed at \$10,000 in each case.

Copper.

The consumption of copper is steadily increasing, as is also the production. The opening of the new copper fields in Arizona, New Mexico, Colorado, and Montana is gradually having its influence, and in some parts of our mining regions more attention is being paid to copper than anything else. Of course, our production on this coast is small, as compared with the Michigan copper mines, which have been worked for years, but the number of mines and of active furnaces is rapidly multiplying. The English market for copper, to a certain extent, regulates that of the world. While the increase of productions was 10,000 tons last year, the English home consumption increased 12,000 tons over 1881. The value of the steam engines and machinery exported from England was £11,962,660, against £9,960,206 in 1881, which at once accounts for a considerable portion of the large home consumption. The French consumption of copper last year was 5,700 tons less than in 1881, owing to the unsatisfactory state of financial affairs in that country. The decrease of exports of English copper was made up by a diminution of 3,000 tons to Germany and Holland, 850 tons to Russia, 750 tons to Egypt, 1,000 tons to France and 1,000 tons to the other countries. India took 1,000 tons more than in 1881. The total exports from England and consumption in England and France, although only 1,000 tons more in 1882 than in 1881, was 19,000 tons greater in these two years than the two previous years. The total English imports of copper in 1882 amounted to 95,222 tons. The average price of English precipitate was, in 1882, 13s. 10½d.

A short time since we stated that it was understood that about 5,000 tons of Lake Superior copper had been sold by contract at 18 cents per pound, with a guarantee on the part of the sellers against lower prices being accepted for exports to Europe when stocks increase or the necessity for keeping prices against the home consumers require it. This would seem to point to the expectation on the part of the Lake Superior companies that any exports to Europe of their surplus stock will not be required for some time to come. This coast is now being considered in the copper market more than ever before, and it will be still more so as the new mines are opened.

Latest English quotations are: Good ordinary brands of Chili bars, £64 15s. to £65; ore, 13s. 1½d., and regulus, 13s. 4½d. per unit. The total visible supply of copper in Liverpool on Feb. 1st, according to James Lewis & Co.'s ore and metal report was, 49,823 tons fine against 49,876 tons on Jan. 1st.

The import of Spanish precipitate and copper produce from all countries, except Chili, into Liverpool and Swansea in 1882 was 24,459. The import of Australia, etc., copper into London was 9,735 tons fine. The import of Chili ore, regulus, bars and ingots into England was 30,112 tons fine. The import of Spanish pyrites into England was 15,673 tons fine. The total import of copper produce into England (exclusive of Glasgow and Newcastle) was 79,979 tons fine. The import of American copper into France was 1,379 tons fine. The import of Chili copper into France was 12,194 tons fine. The total import of copper produce into France was 13,573 tons fine. The total import of copper produce into England and France was 93,553 tons fine. The export from Chili to all countries is estimated at 42,000 tons fine.

The following additional statistics of copper are instructive: Imports into England in 1882, 95,222 tons, fine; exports from England, 53,684 tons; British production, 2,599 tons; English home consumption, 44,820 tons; imports of all kinds into France direct, 13,573 tons; export of English copper to France, 7,022; French consumption of copper, imported direct, 14,506 tons; French consumption of English copper and copper imported direct, 21,528 tons; English consumption and French consumption of copper, imported direct and from England, 66,340; English consumption, English exports, and French consumption of copper imported direct, 115,010 tons.

At the annual meeting of the Sutro Tunnel company, there were represented 1,050,000 out of 2,000,000 shares. The following were elected Trustees for the ensuing year: C. W. Brush, W. Johns, F. F. Low, David Cahn, Thomas P. Storey, Hugh Marshall and P. W. Ames.

New Portable Assay Furnace.

John C. Tappeiner of Bisbee, Cochise Co., Arizona, has just patented, through the MINING AND SCIENTIFIC PRESS PATENT AGENCY, an assay furnace which is intended for the use of prospectors and miners, and to be easily packed up and carried from place to place, as needed. At the top it is decreased in size, and has a collar, upon which the lower section of the pipe is made to fit. The pipe is made tapering, decreasing in size toward the top, and in sections which may be telescoped together, so that the whole can be reversed and placed in the furnace above the grate. A cap then closes the whole and is retained in place by a hinge-clamp on a lock wheel, which also serves to retain the pipe in place when in use.

The exterior casing of the body of the furnace is made of metal or suitable material, and the interior lined with fire-brick, clay, or any non-conducting, heat-resisting material. The body is made tapering, from four to 10 inches in diameter, and about three times as high, increasing in size from the bottom to the shoulders at the top, so that it has the greatest diameter where the greatest amount of room is required. This also gives a better draft. The shoulders of the cover are curved inward from the point of greatest diameter, and a collar is formed at the top to receive the pipe. Within the furnace and around the upper edge is an iron ring about one inch wide and a quarter of an inch thick. This ring resists external pressure, and prevents the furnace being crushed when it is packed on an animal for transportation.

The fire grate is preferably made of sheet iron, coated also with fire clay and with round holes punched in it. The burrs formed by punching the holes are turned up, and assist in holding the coating of fire-clay in place, the holes passing through the clay above. Below the grate is a draft-regulating door, and there is a door about three quarters of an inch above the grate for the introduction of rock drills, etc., to heat them for tempering, when desired. Above this is another door of the proper shape to receive a muffle which fits it, and may be introduced whenever needed.

Sections of pipe are made tapering so that the lower end of the lower section will fit over the collar at the top of the furnace, and the lower end of each succeeding joint fits tightly into the top of the next lower one, when they are all drawn out, thus making a pipe of any desired length.

A door is made in the lowest section of the pipe, through which fuel is supplied to the furnace from time to time, as needed, and through which the crucibles may be introduced.

In order to hold the cover in place and steady it and the pipe, a clamp is employed which surrounds its collar. One end extends down upon the side of the furnace, and has a hinge joint at the other end extending down upon the opposite side of the furnace, and has a lock or pin to hold it.

When the furnace is to be transported, or is not in use, the pipe is taken off, and by reversing it and pressing its small end upon the ground the joints will be loosened where the end of one section binds on the next, and they may be telescoped. When the pipes are telescoped they are put in the furnace small end down, and occupy the space between the grate and the top. Three pair of assay tongs will fit between the pipe and inside of the furnace.

The flux boxes are made round, about two inches high, with central partitions and hinges so that each will form two boxes, and they will fit loosely inside the pipe. The iron muffle will also fit inside the pipe, and will be in no danger of breakage during transportation.

When the whole is in place the cover is shut down upon the top, and is secured by the clamp, the whole being then ready for transportation.

This apparatus is designed for the use of assayers, miners or prospectors, and is compact and portable. It can be packed upon an animal over any trail and into districts, where it can be made available in determining the ore values upon the spot. It is also useful for sharpening and tempering picks, drills and other tools.

At the California State Prison, the following is the result of jute manufacture: Net profits from the manufacture of jute for the month of August, \$6,000; twelve months, \$72,000; net profits from other manufactures, \$65,000; total, \$137,000; total prison disbursements for the year, \$159,831; excess of expenditures over profits of manufactures, \$22,831. The last amount represents the sum which the State will have to pay, and for two years it would amount to \$45,831.

The Mining Bureau.

In conversation with the State Mineralogist one day this week, he stated that he did not see how he would be able to keep the State Museum open unless more funds were forthcoming for its maintenance. On inquiry at the office of the License Collector, the fact is developed that the fund derived from the tax on transfer of mining stock, upon which the Bureau is supported, will amount, for the next quarter, to only \$1,216. The salary of the State Mineralogist is \$250 per month, and the rent is \$200, these two items alone more than consuming the income, leaving nothing for Secretary, janitor, stamps, or any of the ordinary expenses of a museum. The collection is very rapidly increasing, and certain expenses are entailed in arranging the specimens and carrying on the exchange system. More cases, are needed, also. In fact, all the specimens which have come in for some time have been packed up and put away, because there were no means for displaying them.

A bill has passed the Senate appropriating, in addition to the irregular income from the source noted, and on which the Bureau has entirely depended, the sum of \$10,000 for two years, or \$5,000 per year. But Mr. Hanks says that this is not enough to carry on the institution properly, and even with this appropriation he will be compelled to close the Museum and give up that part of the Bureau's functions. It will be necessary to box up and store the collection. Then Mr. Hanks will take a small office and attend to the affairs of the Bureau without having any collection exhibited at all.

It seems too bad, just at a time when we are to have a large influx of visitors from the East, that our collection of minerals must be closed up. If, however, proper provision cannot be made to keep it up in good shape, it is just as well that this museum be closed, and the Bureau be one of information only, without a museum.

The collection of ores and minerals can then be turned over to some other State institution, the University for instance, as it is the property of the State. It is, of course, desirable to have it maintained here, but, that being impossible, it will be more useful at the University than elsewhere, since it will swell materially the already large collection at that institution and be available to all who desire to go to Berkeley to examine it.

It is to be hoped, however, that with the tax income and the appropriation, Mr. Hanks will find some way of keeping the museum open for the next two years, by which time it may be that more interest will be shown by California in its mining industry, and this representative institution be properly supported.

Mining Debris Dams.

Last year a temporary injunction was issued at the suit of Diggorry Hobbs against the Sacramento and Amador Canal Co., a hydraulic mining company operating at Hilltop, on the Cosumnes river, near Michigan Bar. The company afterwards constructed dams to impound the debris. At the hearing before Judge McFarland, of Sacramento, recently, plaintiff claimed that these dams were not dams at all, and backed his allegation with large photographic views, showing a structure something like a dam, with an open cut or flume in the center, through which, it was asserted, all kinds of material was carried by the water. The plaintiff or his attorney did not seem to understand how such dams are made, when built properly, and they thought when the photographs were made they had a sure thing on showing purposely careless construction. It is, of course, necessary, while retaining the debris, to allow the water to pass over. As the debris packs up behind the dam, and gradually rises, the dam is gradually raised in the center. The wisacres who brought in those photographs did not know of the necessity of thus gradually building the dam up. They evidently supposed it necessary to build the dam to its full height right off, and have a 100-foot dam for a foot of tailings, holding back 99 feet of water to do this. The miners think this is a pretty good joke on their rivals, the farmers, as they say most farmers consider themselves just as good engineers as those in the profession.

At all events, when Judge McFarland last Monday decided the case, he did not accept the position of plaintiff, that the defendant had no right to pollute the waters of the stream at all, but he modified the injunction, allowing the defendant to work its mines, on condition of exercising the greatest diligence in keeping its dams up to their present efficiency. This, he held to be in accordance with the decision in the Gold Run case.

Anderson's Stock Car.

Very great attention is now being paid to the question of the proper transportation of live stock by railroad. Efforts are being made to cure existing evils, as far as possible, by providing better means of caring for the live stock in transit. A great deal of thought and study is being extended in this direction in the East, as well as here. Mr. Adolph V. Anderson, of Virginia City, Nevada, has recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency an improved stock car, which is intended to facilitate the transportation of cattle, horses and other animals in safety and comfort.

Such are the various improvements in construction that it will be necessary to go somewhat into detail in order to describe the invention. Six views are given in the accompanying engraving. Fig. 1 is a sectional side elevation of a car to which the improvements have been applied, parts being broken away. Fig. 2 is a sectional side elevation of a water-trough and its supports. Fig. 3 is a plan view of a feed trough, folded. Fig. 4 is a sectional end elevation of the same, opened. Fig. 5 is a plan view, partly in section, of a part of the car. Fig. 6 is a sectional end elevation of the same.

A represents an ordinary box-car, the interior of which is divided into a number of stalls by partitions. Each stall partition is formed of three upright boards or bars, B, C, D, which are connected by two pairs of bars, E, F. The outer ends of the bars, E, F, are hinged by bolts, or other suitable means, to the outer bars, B, D. The inner ends of the bars, E, F, are hinged to each other by suitable means, which bolts pass through a longitudinal slot in the central bar, C, and are attached to the ends of connecting bars, G, placed upon the sides of the said central upright, so that the three uprights, B, C, D, can be drawn together and forced apart to contract and expand the partition by operating the bars, E, J.

The outer, or forward end of the lower bar, F, is extended beyond its pivot, and to the extended end is pivoted the upper end of a short link, H, the lower end of which is pivoted to a collar, I, attached to an upright rod, J. The rod, J, slides up and down in keepers attached to the car body, passes through a guide hole in the bottom of the car, and to its lower end is hinged a lever, K, which is fulcrumed to a support attached to the car frame, so that the stall partition can be contracted and expanded from outside the car by operating the lever, K.

The outer edge of the upright, D, is hinged to the car body, so that the partition, when contracted, can be swung around against the side of the car, so as to be out of the way when freight is to be stowed in the car. The upper and lower ends of the uprights, B, C, slide in grooves in the guide bar, L, the outer ends of which are rigidly attached to the ends of the upright, D.

The guide-bars, L, are made in two parts, hinged to each other at the outer edge of the partition when contracted, so that the hinged parts of the bars can be folded against the edge of the upright, B, when the partition is to be swung against the side of the car. The lower bar, L, is held against lateral movement when in place, by pins, M, inserted upon the opposite sides of the said lower bar, L, near the end of the hinged part of the bar, in holes in a plate, N, let into and secured to the floor of the car. The hinged part of the lower bar, L, is held from lateral movement by two pins, O, hinged to a slotted plate, P, let into and secured to the car floor, so that the pins, O, can be turned up at the opposite sides of the said part of the bar, L, and can be turned down into the slots in the plate, P, when not required for use. The upper bar, L, is held from lateral movement at one side by a bar, Q, attached to the upper part of the car frame, and at the other side by a catch, R, that slides in a guide attached to the top frame of the car, in such a position that the catch, R, will engage with the main part of the bar, L, near its hinged part. The hinged part of the upper bar, L, is held against the stop-bar, Q, by a stationary catch, S, attached to the top frame of the car. The hinged part of the upper bar, L, is supported, when raised into a horizontal position, by a pin, T, inserted in a hole in the stationary catch, S, and in the hinged part of the bar L.

The animal in a stall is kept from backing into an adjacent stall by a bar, U, the inner end of which is slotted to receive the edge of the upright B, to which is attached a pin, V, or other stop to prevent the bar, U, from dropping down too far. The outer end of the bar U, is hinged to a post of the car frame, so that it can be turned up against the said post to allow the animals to pass and when not required for use. When the hinged bar, U, is in an upright position it rests against the side of a guide plate, W, attached to the post of the car frame, and is secured in place by a pin, X, passing through the said plate W, and into the said bar U. The spaces between the rafters of

the car are inclosed to form chambers, Y, to receive grain or other suitable feed, which is inserted through openings Z, in the roof of the car, the said openings being closed by suitable covers, a. With the lower part of each chamber Y, or with a chute, b, connected with the lower part, is connected the upper end of a tube, c, the lower end of which is inserted in the feed-box d, so as to deliver grain into said feed-box as fast as it is eaten out.

Upon one end of each side, l, of the feed-box

the lower bars, E, F, by the bolt that pivots the said bars, E, F, to each other. With this construction the bottom of the feed-box, d, will be raised by the movement of the bars, E, F, in contracting the partition, and the said feed-box will be folded together by the pressure against it of the partition as the said partition is swung around against the side of the car.

To the lower parts of the tubes, c, are attached hands, g, provided with eyes to receive hooks, g', attached to the upper part of the car

out of the way of the animals when passing into and out of the car. When the hinged tube, c, is swung up to the top of the car the discharge opening of the feed-chamber, Y, is closed by a slide, h, which slides in the keepers or guides, i, attached to the upper part of the car.

To each end of the car is attached a water-tank, j, which is made of galvanized sheet-iron, or other suitable material, and with the top of which is connected the end of a tube, k, which extends along the upper part of the car roof, and with it is connected a funnel, l, passing in through the said roof, as shown in Figs. 1 and 6.

With the upper part of each tank, j, is connected the end of a flexible pipe, m, which is provided with a valve, n, at its inner end, and is made of such a length that it can be coupled with the end of a corresponding pipe connected with the adjacent car. With this construction the tanks of all the cars can be filled with water introduced into the funnel, l, of one car, from the station-pipes that supply the engine tank with water, or from any other convenient source.

With the lower part of each tank, j, is connected the end of a pipe, o, which passes along the side of the car to the doorway, and is provided with a series of faucets, p, arranged to discharge water into the various water troughs, q, of the car. Each water trough, q, is provided with hooks, r, which are hooked upon the upper edge of a plate, s, sliding up and down in guides t, attached to the car, and the downward movement of which is limited by a flange, u, or other stop, formed upon or connected with the lower ends of the guides, t.

To the upper end of the supporting slide, s, is attached the lower end of a connecting rod, v, the upper end of which is pivoted to the end of a lever, w. The other end of the lever, w, is pivoted to the car frame. To the lever, w, is pivoted the end of the valve-stem of the faucet, p, and to the said lever is attached the lower end of a spiral or other shaped spring, x, the upper end of which is attached to the car frame. The spring, x, is arranged to hold the faucet, p, open, and is made of such a tension as to support the water trough q, until it is nearly filled with water.

With this construction, when the weight of the water trough, q, and the water contained in it becomes greater than can be sustained by the tension of the spring, x, the said spring yields and allows the trough, q, and the slide, s, to descend, closing the faucet, p, and preventing any more water from flowing out of the said faucet until so much water has been removed from the said trough that it will be raised by the tension of the spring x. This movement opens the faucet, p, and allows the water to again flow into the trough, q, until the descent of the trough again closes the faucet, so that the trough, q, will be constantly supplied with water.

In loading the car with animals the stalls are filled in succession, beginning at the ends of the car, and as each stall is filled the partition separating the stall from the next empty stall is expanded and secured, and the bar, U, is lowered. The double stall at the center of the car is filled last by driving two animals into it.

In unloading the car the animals in the double stall are first driven out, and then the hinged bars, U, are raised, and the partitions are contracted and swung around against the side of the car, from the center toward the ends, in succession. The car can then be washed out with the water remaining in the tanks, and the car is ready to be again loaded with animals or other freight.

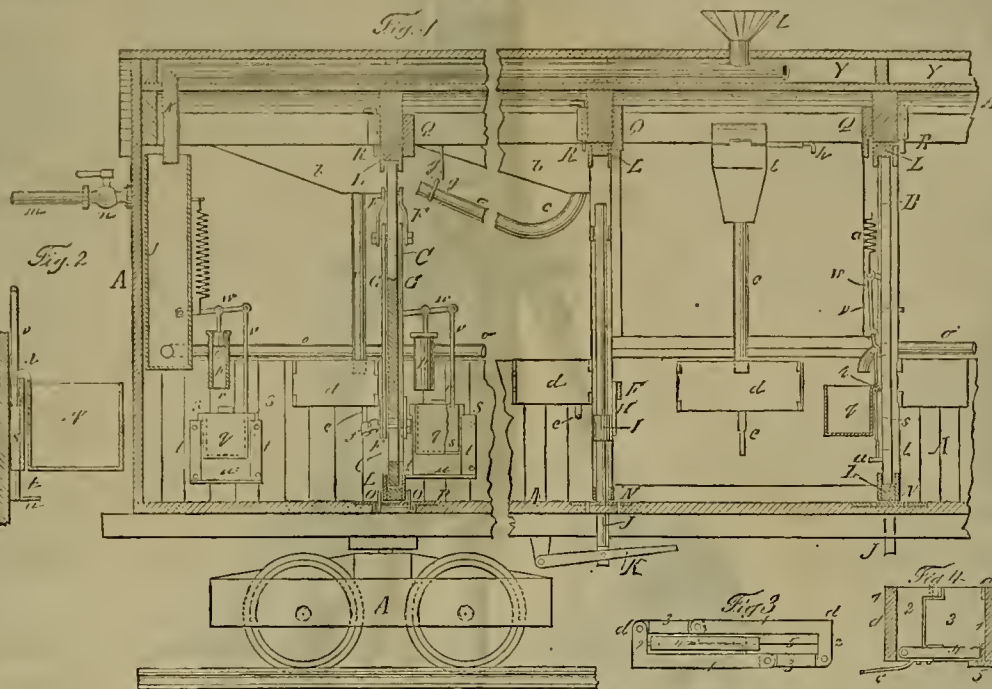
This patent is for sale, or royalty rights will be granted. Parties desiring other information may communicate with the inventor at 92, corner B and Mill streets, Virginia, Nev.

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THE Richmond Con. Mining Co., of Nevada, paid a quarterly dividend of \$2.50 per share, or \$135,000, at London, on the 7th of February, making a total of \$3,909,500 to date.

THE Peabody mine, in Arizona, is reported to be sold to a Scotch company for \$300,000.



SECTIONAL SIDE ELEVATION OF ANDERSON'S PATENT STOCK CAR.

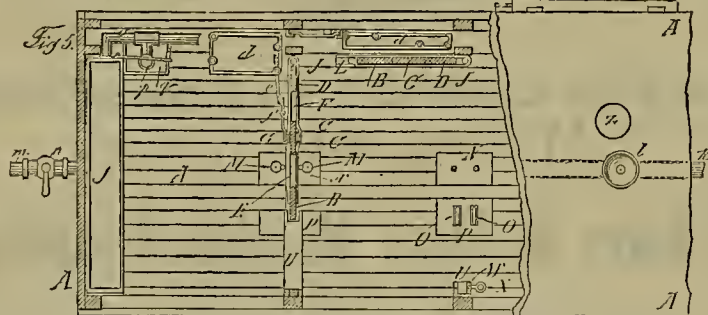
d, at the opposite ends of the said feed-box, is formed a narrow flange, 2, projecting at right angles, to the end of which is hinged the edge of the end piece, 3, the other edge of which is hinged to the end of the other side, 1.

To the lower edge of the inner side, 1, of the feed-box d, is hinged the edge of the bottom, 4,

frame, to support the tubes, c, out of the way and prevent the feed from flowing out of the chambers, Y, when the feed-box, d, is folded or otherwise not in use.

The space opposite the car doors is made to serve as a double stall to receive two animals.

In this case the folding feed-box, d, is attach-



PLAN AND END ELEVATION OF ANDERSON'S STOCK CAR.

the free edge of which, when the said feed-box is opened, rests upon a flange, 5, formed upon or attached to the lower edge of the other side, 1, of the said feed-box.

To the bottom, 4, is rigidly attached a downwardly-projecting arm, e, the lower end of which is pivoted to the outer end of a connecting bar, f, the inner end of which is pivoted to

the inner side of the car door, and the feed-discharge tube, c, is hinged at its upper end to the top of the car frame in such a position that its open upper end will cover the discharge opening of the feed-chamber. The hinging of the tube, c, allows the said tube to be swung up close to the roof of the car, and hung upon its supporting hook, so as to be entirely

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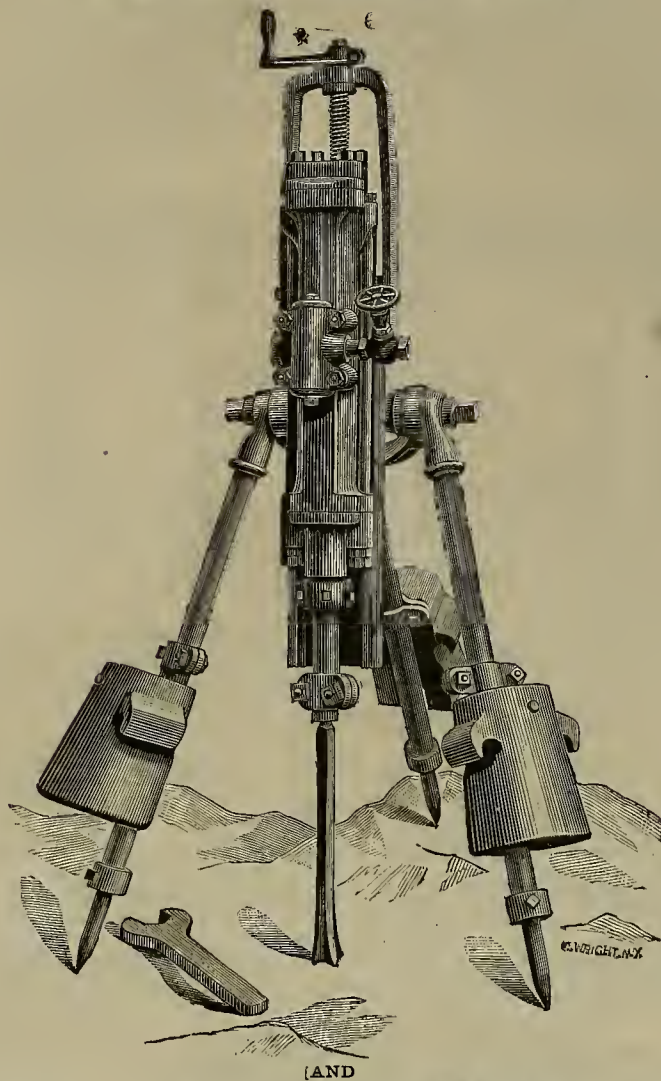
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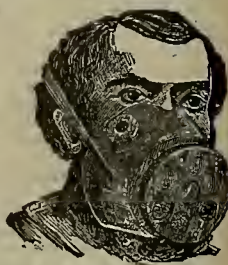
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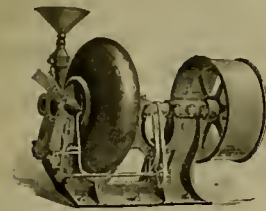
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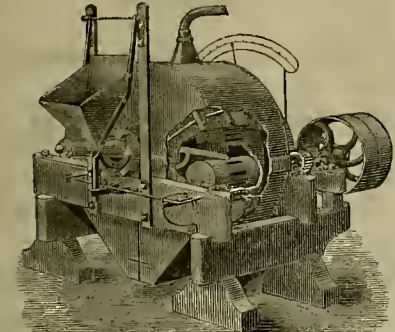
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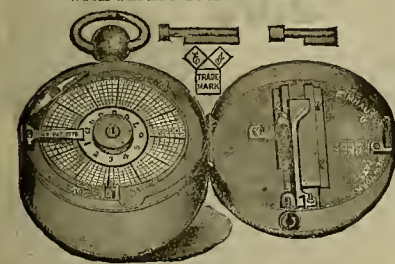
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

WEEK ENDING FEB. 27, 1883.

273,021.—ROLLER DREDGER.—A. J. Burt, Olympia, W. T.

273,092.—AUTOMATIC TIME GLOBE.—Andrew Jackson, S. F.

273,095.—TAIL PIECE AND REIN PROTECTOR FOR HARNESSES.—C. H. Mead, Jr., S. F.

273,109.—COOKING CABINET.—Adolph Segal, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

AUTOMATIC TIME GLOBE.—Andrew Jackson, No. 273,092. Dated February 27, 1883. The inventor calls this an "Improved Astronomical and Geographical Automatic Time Chart and Globe." It consists in a peculiar terrestrial globe, upon the base of which is marked distinct series of lines representing a general calendar, as the various divisions of time, the position and movement of the sun, and its effect upon the length of day and difference between the mean and sun time, and others of like nature, while the top is provided with a revolving cap upon which is marked the divisions of hours up to 24, to make the day. The interior of the globe is provided with a peculiar gearing operated by the mechanism of a clock, the face of which is exhibited upon the face of the globe. This gearing is connected with a disk, upon the rim of which are secured adjustable pointers, projecting through a circumferential slot in the base of the globe, and adapted to be directed by the revolution of the disk to the successive divisions in the various series marked thereon. The gearing is also connected with an electric alarm and is so constructed as to operate at any desired periods or divisions of time. The object of the invention is to provide a simple and economical globe for the use of schools, by which a number of facts and results and their causes may be readily demonstrated and easily acquired, and at the same time provide for its automatic action, and thereby, in addition, furnish an alarm for calling attention to any desired time or times.

PISTON WATER METER.—Frank Walker, Tombstone, Arizona. No 272,607. Dated Feb. 20, 1883. This invention relates to a new and useful water meter of that class in which reciprocating pistons work in a cylinder of known capacity. The invention consists in a novel valve and valve chamber, and the arrangement of parts therein whereby the pistons are operated and the valve reciprocated longitudinally, and it further consists, in connection with the valve and valve chamber, in a slotted connecting rod between pistons, and an intervening lever-valve whereby the strokes of the piston are transmitted to the register. In the formation of these buckets or flanges, two main points have heretofore been considered. The first is the impact of the stream, and the second its discharge. A good surface may be presented to the water, but the bucket may be so constructed as to hinder its discharge, which, by not being readily freed, retards the progress of the wheel. In like manner the buckets may free themselves easily but may not receive the stream to the best advantage. To these two points a third may be added—namely, the splash. No matter how readily the buckets may free themselves, there must be more or less splash on account of the force with which the water is directed upon them, and this splash not only takes away from the resulting or continued force of the water, but as an actual hindrance to revolution. In the construction of this bucket, this inventor claims that he gains all the advantages described in receiving and discharging the water and avoiding all splash.

TWO-WHEELED VEHICLE.—Geo. P. Kimball, S. F. No. 272,557. Dated Feb. 20, 1883. This improvement in two-wheeled vehicles consists in a novel construction of the shafts and in their relation to the axle and body. It consists also in a novel arrangement of the springs and the footboard in relation to the shafts, axle and body. The object is to provide an easy riding vehicle, which, on account of the construction and arrangement of its parts, will be both economical and effective.

DRESSING SAW-TEETH.—Stephen H. Chase, San Jose, Cal. No. 272,530. Dated Feb. 20, 1883. This is a novel device for jointing circular saws and more especially relates to a tool which is adapted to joint or dress the sides of the teeth. The invention consists in certain details of construction. The object is to provide a device for dressing or jointing the sides of the teeth of a circular saw, after they have been swaged, to bring them into line with one another and cause them to cut clean.

WATER-WHEEL BUCKET.—Charles D. Smith, Amador City. No. 272,592. Dated Feb. 20, 1883. This invention relates to a new and useful bucket for water wheels of that class which have their rims formed with, or have bolted or secured thereto, flanges or buckets, which receive the impact or force of a stream of water under pressure. The invention consists of a hollow or chambered bucket, provided with a central opening to receive the water, and separate and distinct discharge openings at the ends through which to discharge it outside of the plane of revolution of the wheel. The object of the invention is to utilize the entire body or stream of water by so receiving and directing it as to avoid all splash, and cause it to exert its force to the best advantage. The object may be better seen by a brief reference to the points to be observed in the construction of wheels of this class.

GAS PURIFYING SCREEN.—Emanuel M. Provancher, Vallejo, Solano Co. No. 272,582. Dated Feb. 20, 1883. The object of this invention is to expose as much of the body of lime to the gas as possible to provide an easy means for forming the screen and removing old or inserting new slats, and to have a ready means either to support or raise it.

NICKEL WIRE IN SILVER AND GOLD LACE.—Silver plated copper wire, as is well known soon loses its silver coating and assumes a disagreeable copper color and smell. Aluminum has been alloyed with silver to avoid this difficulty, but not with much success. A better method is that recently adopted by a German firm at Weissenberg, which makes use of nickel alone, that metal having first been deprived to a large extent of its brittleness. Later Messrs. Fleitman and Witte, of Iserlohn, made the discovery that the addition of a small quantity of other metals would render the nickel so ductile that that metal itself unalloyed could be drawn out into wire of the finest numbers and be scarcely inferior to copper. Wire has been drawn so fine that 18,000 meters only weighed 100 grammes (or 12 miles weighed about 3½ ounces avoirdupois). Ductile nickel differs from copper, so that the increase of price for increased sizes differs from that of the plated copper wire hitherto in use. For articles subjected to much wear and the action of the weather, this ductile nickel will be very useful. For the lace used on military uniforms the plated copper wire will go out of use entirely, as nickel wire would always keep white and no verdigris ever be formed. Great anticipations are made for it in other directions, too.

LADIES and all sufferers from neuralgia, hysteria, and kindred complaints, will find without a rival Brown's Iron Bitters.

POTELINE is a new substance, named after its inventor, and which he claims to be insusceptible of many useful applications. It is substantially a mixture of gelatine, glycerine and tannin. It is claimed to be absolutely impervious to the air. It becomes liquid, or nearly so, on being warmed, and assumes the contour of objects. The inventor has made corks of it which form an economical substitute for metallic capsules, and make a hermetic seal. He also recommends it as a preservative of meat, which, when treated with poteline at a temperature of 112°, is said to retain its freshness for several months. It appears to act by its ability to perfectly exclude the air when the meat is enveloped by it.

News in Brief.

PARNELL is coming to America.

GOVERNOR ALEXANDER H. STEPHENS, of Georgia, is dead.

The Mexican Central road has satisfactorily placed a loan of \$6,000,000.

LAST CHANCE is the name of a new town on the Northern Pacific road, 586 miles from Portland. The town is composed of one barber shop, three China wash houses, six restaurants, eight stores and only 32 saloons.

FOUR hundred workmen were dismissed from the manufacture of firearms at Steyer, Austria, on account of lack of orders from abroad. The total number employed will be reduced from 6,000 to 5,000. Many intend to emigrate to America.

THE Dominion Government, supported by the English Admiralty, is to put a cruiser on Hudson Bay this summer, to ascertain how much of the year Hudson Strait is open to navigation.

THE contemplated trip to California of Chas. A. Dana, and Simon Cameron and families is delayed by the illness of Cameron's son. They will start within a fortnight, traveling by the Southern Pacific.

THE reduction of the tobacco tax, provided in the internal revenue clause of the tariff bill, goes into effect on May 1st. The abolition of taxes on the capital and deposits of banks, bankers and national banking associations takes effect immediately; on bank checks, drafts, matches, perfumery, proprietary medicines, and the revised duties on imports, on and after July 1st next.

CHAMP ORR PUT VERIZPR.—There is for sale in this city, as will be seen by our advertising columns, a second-hand Rutherford Pulverizer, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it.

New Life

is given by using BROWN'S IRON BITTERS. In the Winter it strengthens and warms the system; in the Spring it enriches the blood and conquers disease; in the Summer it gives tone to the nerves and digestive organs; in the Fall it enables the system to stand the shock of sudden changes.

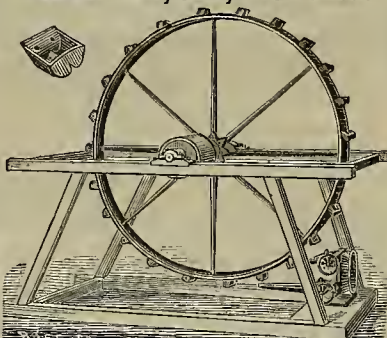
In no way can disease be so surely prevented as by keeping the system in perfect condition. BROWN'S IRON BITTERS ensures perfect health through the changing seasons, it disarms the danger from impure water and miasmatic air, and it prevents Consumption, Kidney and Liver Disease, &c.

H. S. Berlin, Esq., of the well-known firm of H. S. Berlin & Co., Attorneys, Le Droit Building, Washington, D. C., writes, Dec. 5th, 1881:

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JAMES W. BURLING, Secretary.

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Mining Companies.

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DIVIDEND NOTICE.

OFFICE OF THE
Kentuck Mining Company.

San Francisco, March 3, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 35, of Ten Cents (10c) per share, was declared, payable on MONDAY, March 19, 1883. Transfer books closed on Tuesday, March 13, 1883, at 3 o'clock p. m.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine Street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE
Bulwer Consolidated Mining Company.

San Francisco, February 24, 1883.

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 16, of Five Cents (5c) per share, was declared, payable on MONDAY, March 12, 1883. Transfer books closed on Friday, March 2, 1883, at 3 o'clock, p. m. This dividend is payable at the Farmers' Loan and Trust Company in New York, on all stock issued there, and at the office in this city on all stock issued here.

WM. WILLIS, Secretary.

OFFICE—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE
Standard Consolidated Mining Company.

San Francisco, March 1, 1883.

At a meeting of this Board of Directors of the above-named Company, held this day, Dividend No. 52, of Twenty-five Cents (25c) per share, was declared, payable on MONDAY, March 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WM. WILLIS, Secretary.

OFFICE—Room No. 29 Nevada Block, No. 309 Montgomery street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE
Navajo Mining Company.

San Francisco, March 2, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 7, of Twenty-five Cents (25c) per share, was declared, payable on TUESDAY, March 13, 1883. Transfer books closed on Wednesday, March 7, 1883, at 3 o'clock, p. m.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE
Silver King Mining Company

San Francisco, March 6, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 39) of Twenty-five Cents (25c) per share was declared, payable on THURSDAY, March 15, 1883, at the office of the Company, Room 19, No. 325 Montgomery Street, San Francisco, Cal. Transfer Books will close March 9, 1883, at 12 m.

JOSEPH NASH, Secretary

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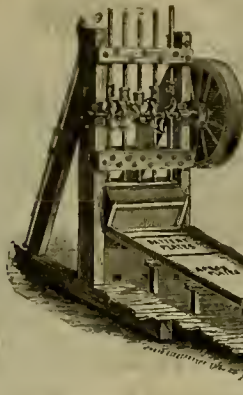
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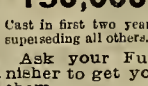
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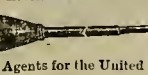
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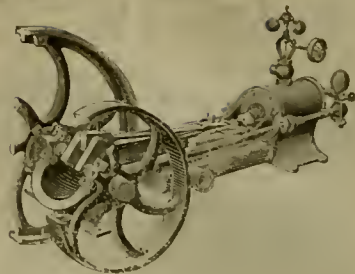
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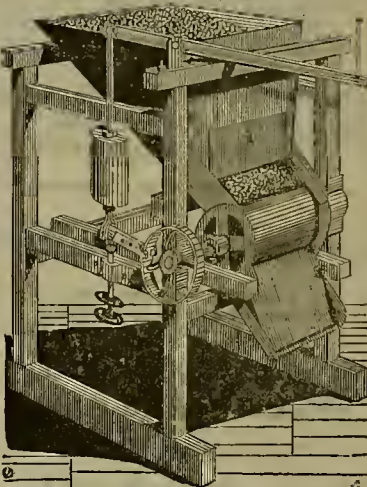
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The following speaks for itself:

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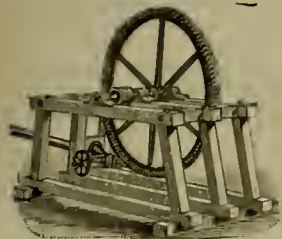
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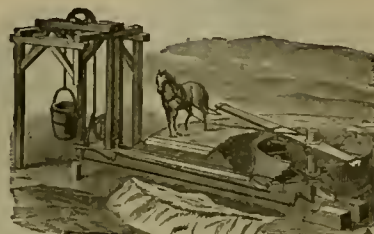
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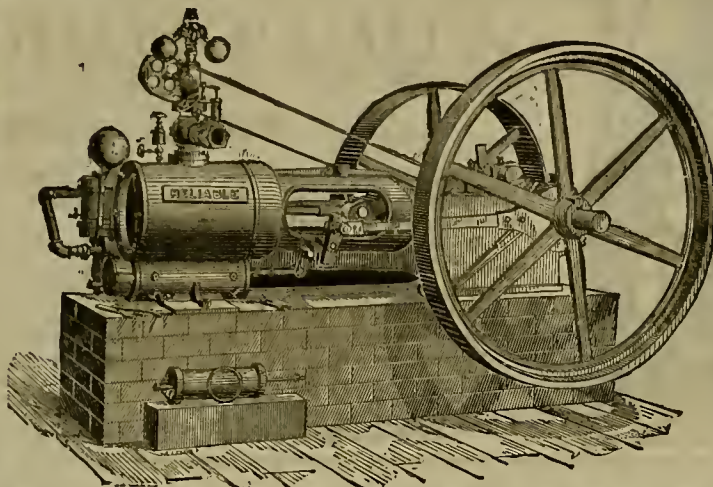
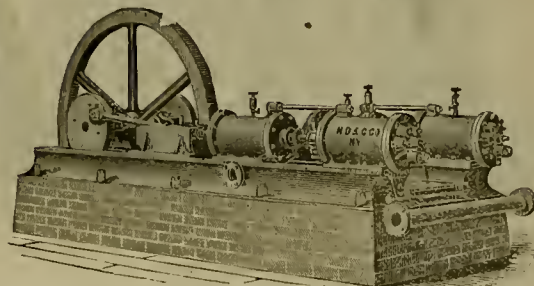
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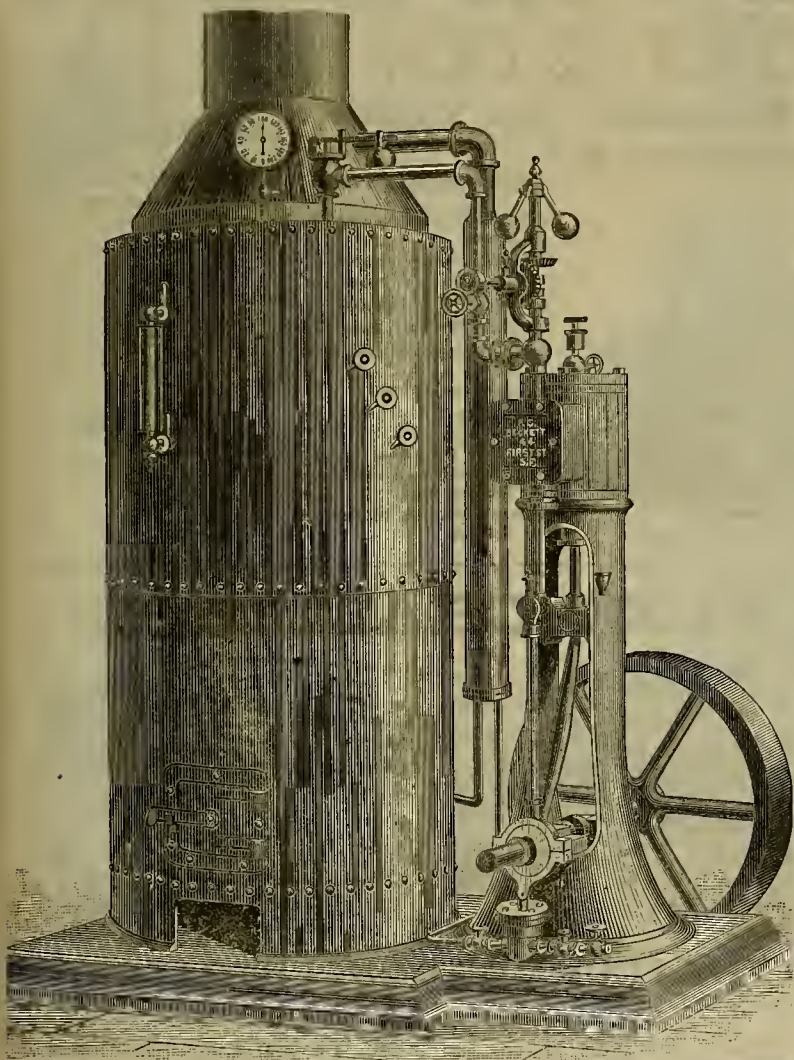
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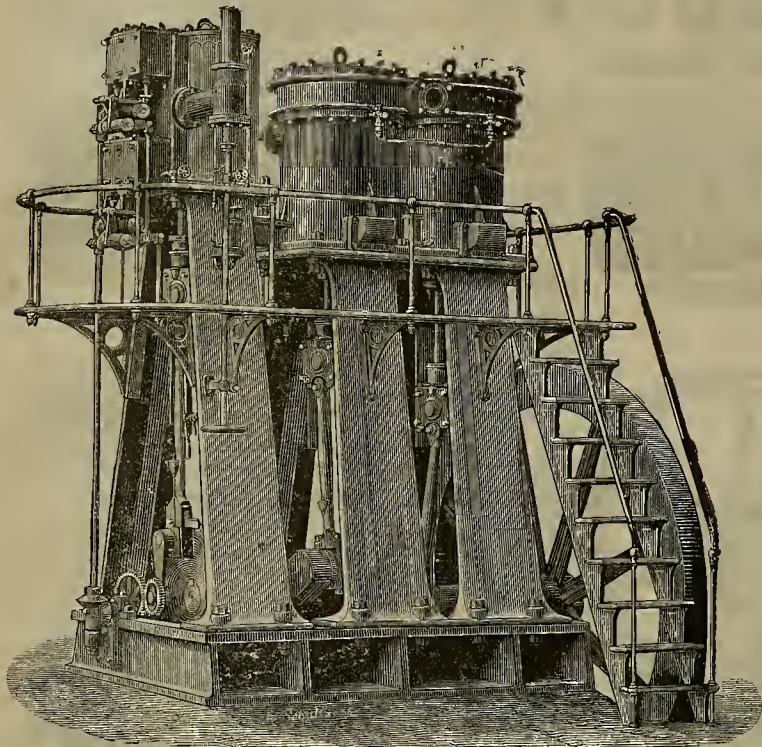
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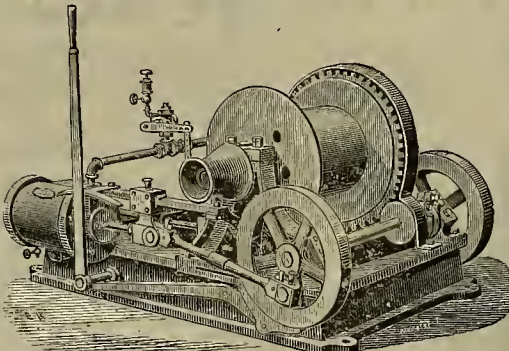
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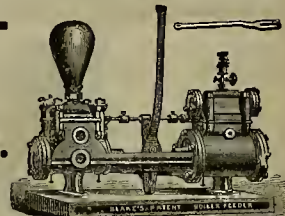
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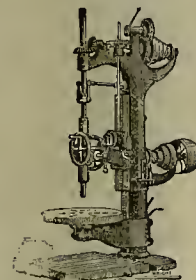
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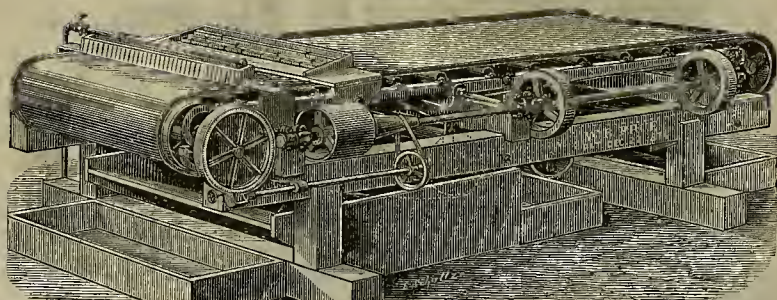
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Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order, and ready to make tests, at the office of Hinckley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

Room 7, 109 California Street,
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SAN FRANCISCO, CAL.



To Prospecting Quartz Miners.

Miners having reliable properties in California, and who are willing to give one-half of their interest in the same for suitable machinery, may benefit themselves by corresponding with me. Now wanted on this day: A decomposed quartz lode, where water can be had for power; also a mine sufficiently large and developed for a 40 Stamp Mill. Address,

ALMARIN B. PAUL,
Room 20, Safe Deposit Building, San Francisco.

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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, MARCH 17, 1883.

VOLUME XLVI
Number 11.

Gold Discoveries in British Columbia.

As early as June 1856, Mr. Douglas, the Governor of Vancouver's Island, reported to the Secretary of State the discovery of gold in British Territory, north of the 49th deg. of latitude, and stated that the earnings of the diggers range from £2 to £8 per day. In consequence, however, of the hostile attitude assumed by the natives, the number of diggers was very limited. Altogether, this discovery attracted at first less attention than might have been anticipated; but, in December 1857, Governor Douglas reported that the Indians themselves were extensively engaged in the search for gold, and that the accounts which had reached Oregon and California had caused considerable excitement. It was not, however, until May, 1858, that a stream of immigration, sufficient to overpower the opposition of the aborigines, had fairly set in, and the British public learned for the first time, that the mainland of New Caledonia, as the district extending from the Red river to the Pacific was somewhat vaguely designated, was a rich auriferous country, which gave every promise of becoming a flourishing and important colony.

Beginning with the Fraser river, the main artery of the auriferous region, gold is known to exist, and has been worked at a great many places on its course, from a point about 45 miles from its mouth up to near its source in the Rocky mountains—in other words, from the 49th up to the 53d parallel of north latitude, a distance, taking in the windings, of some 800 miles. The union of the two branches forms the Fraser river proper. Adding the north branch, which is also a gold-bearing stream, the two will give a continuous stretch of auriferous territory, upwards of 1,000 miles in length, extending for many miles back into the country, but not including the tributary rivers which fall into the Fraser. In short, the river itself is known to be auriferous, and to pass through a gold-bearing country throughout its whole course. Gold is also found in many tributaries of the Fraser, of which no less than 59 are known.

These facts do not, however, by any means convey an accurate view of the extent of the area of the gold fields, because these observations are limited to the central portions only of the country, while the whole of the upper portion of British Columbia is said to be auriferous.

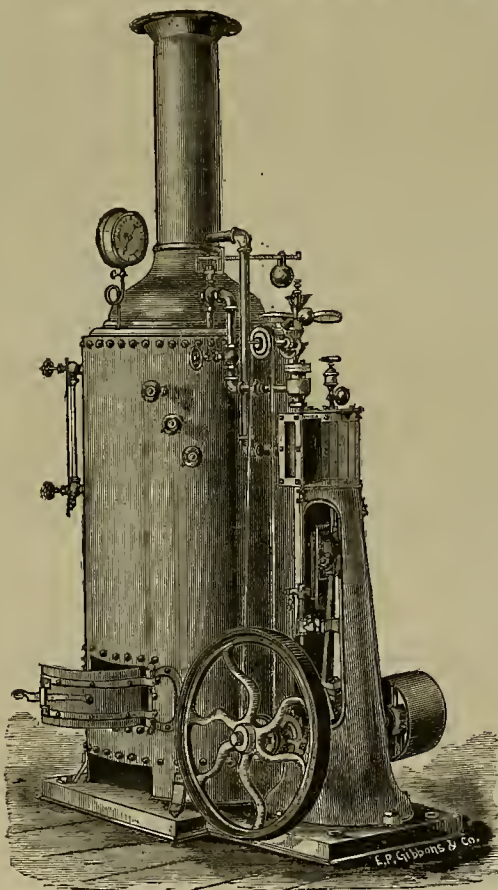
Besides the gold found in the beds and on the shores of streams, the Fraser itself and many of its tributaries are skirted by terraces which yield gold. These terraces, or "benches," as the miners call them, run at intervals along both sides of the river for miles in length, and recede where the mountains fall back into the valleys, varying in breadth from a few yards to several miles. These are objects of curiosity, and add much to the beauty of the scenery in which they occur. They are generally found on both sides of the river, at the same place, sometimes at the same elevation on both sides, sometimes at different elevations—high on this and low on the other side of the river; and in some places they are multiplied into several successive level platforms, rising one above the other as they recede from the bank. These terraces are composed of the ordinary alluvial deposits, loam, gravel, stones, sand, and boulders, and are thick masses, generally rising about 150 or 200 feet.

Gold

Gold is nearly always found in the metallic state, but never pure. A good crystal is considered a rarity. The octahedron and dodecahedron are the most common forms. Crystals sometimes acicular, through elongation of octahedral or other forms; also passing into filiform, reticulated, and aborescent shapes, and occasionally spongy from an aggregation of filaments; edges of crystals often salient. Cleavage, none; twins: twinning plane octahedral;

In metallurgical works the proportions of mercury to gold in amalgam vary greatly, owing to the size as well as the purity of the particles of gold which have been brought into contact with the mercury. It has been found in reduction works in California that the due percentage of mercury in the gold amalgam obtained varied from 36 to 85%. Nearly all the metallurgical products from lead, silver and copper smelting works contain gold, and especially those obtained from the smelting of argentiferous lead ores; but, as a general rule,

The hood is of cast iron and all the fittings to the boiler are of the best manufactured. The boiler and engine are secured firmly to a cast iron bedplate and weighing but eleven hundred pounds. It is shipped in one piece and is ready to run upon arriving at destination. There are but two sizes of this style of engine and boiler manufactured at present, the three horse and five horsepower. They are especially designed for nice work and are recommended to those desiring to run tank pumps, woodsaws, spice mills, desiccating machinery, arrastras, or small hoisting works. These engines are made in this city by Edward A. Rix, Nos. 47 and 49 Fremont street. At the same shop is manufactured a friction hoisting reel, complete with all attachments to connect with this engine and boiler for prospecting purposes. Those looking for small hoists for prospecting and who desire more power than given by a whim should examine these "Baby Hoists."



RIX'S IMPROVED VERTICAL ENGINE.

Also, massive and in thin laminae. The above forms usually occur in veins or lodes.

In alluvial soils, streams, rivers, and gravel beds, gold is generally found in flattened grains or scales and in rolled masses.

Hardness—25-3. Spec. gravity—15.6-19.5; 19.30-19.34 when quite pure (G. Rose.)

Gold is generally alloyed with silver in various proportions, and pieces from California, Idaho, and Nevada, have been assayed by Mr. George Attwood and found to contain as much as 50 per cent. silver; whilst the purest native gold from the same sources that were examined have assayed 97 per cent. pure gold and nearly 3 per cent. silver.

Gold is also found combined with copper, iron, bismuth, palladium, rhodium, and tellurium. Gold combined with mercury in what is generally termed gold amalgam. Gold is also found associated (or as an incidental ingredient) with certain ores containing iron and copper pyrites, mispickel, blend, and galena,

the quantity is too small to pay for extraction, as in many instances a "slight trace" can only be found by the most careful analysis.

Improved Vertical Engine and Boiler.

The vertical engine and boiler illustrated on this page is one rapidly coming into use on this coast. It does not differ in general plan of construction from many vertical engines and boilers now manufactured, but in finish and nicety of adjustment, and elegance of design it is far superior. The working parts to the engines are made from steel highly burnished; the connecting rod of phosphor bronze, which allows the greatest tensile strength while giving the smallest comparative diameter; all parts to different engines are interchangeable and made to standard gauges. The boilers are made from the best of iron, and the shell is fine sixteenths thick and all carefully rivetted and each tested to 200-pounds pressure.

Early History of the Comstock Mines.

EDITORS PRESS:—In your issue of Feb. 24th, your correspondent, Mr. Chas. Schuchard, in his interesting communication (page 126), refers to some notes on the discovery of the silver ore of the Comstock lode, which he thinks were published in the *Mining Magazine*. He is correct in this reference. One of the first notices of the discovery (if not the first), outside of the notices in the daily newspapers of that time, appeared in the *Mining Magazine* for January, 1860, (second series, vol. 1, page 221.) A short notice appeared also in the number for December, 1859. Both of these notices, and several others which followed, were written by myself as the editor of the *Magazine*. The first notice was based in part upon a letter from the correspondent of the *New York Daily Times*, over the signature, "Podgers," but known to me as Capt. Richard L. Ogden, who was early interested in the discovery, and was, I believe, at that time associated officially with Gen. Allen, the Army Quartermaster in California. In his letter of November 5th he stated that the vein had been traced over a thousand feet. The Walsh company had 1,400 feet, and next to this claim Bryant and Raymond had purchased 50 feet, for which they had paid \$400 per foot. By a later notice (page 242) it appears that on the 29th of November, 1859, over three tons of silver ore had arrived in San Francisco, and a share of 1-40th in the original location on the vein sold for \$10,000.

Shipments of ore to New York commenced early. Mention is made of several tons which arrived in January, 1860. It consisted of granular galena with copper pyrites in quartz, but contained grains and filaments of native silver (p. 323.) Some of these lots of ore sent to New York were smelted at the works of the New York Smelting Company, on Staten Island. On page 405 of the *Magazine* will be found a reprint of a communication relative to Virginia town and Washoe valley by Mr. F. Hughes, and on page 409, in a letter from "Podgers," giving an account in detail of the discovery and of the excitement, of Major Killey and his death shortly after making the assay. Residents of Grass Valley, Cal. as early as 1854, will remember this enthusiastic Mexican miner and assayer, who lived in Boston ravine, and had there one of the first Freiberg blowpipe assaying outfits seen in California. The same letter gives an account of the formation of the Ophir Company of which Mr. Ogden was Treasurer. The shaft was then 50 feet deep (p. 410.) About that time, I received samples taken from the Ophir mine of the black, brittle ore from Mr. Ogden; some fragments were crystalline, and, on examination, I found that they were crystals of *Strophantite*, or *Brittle Silver*, and announced it in the *Magazine* (p. 479.) This was the first scientific identification of this mineral species in that ore, and it had not been before that time known to occur in the United States.

WM. P. BLAKE,
Mill Rock, March 4, 1883.

CORRESPONDENCE.

A Gold-Producing Region.

EDITORS PRESS:—About seven miles south-east of Angel's camp, on the Stanislaus river, are the Garibaldi gold quartz mines, consisting of the Garibaldi South, the Andromeda, the Pharis and the Polaris, all true fissure veins of a strong and permanent character. They are situated on the great "Mother lode," which extends from Alpine Co., on the north, to Mariposa Co., on the south, and are enclosed in a bend of the Stanislaus river, forming a peninsula containing about 400 acres. The walls of these veins are slate and dioritic, or crystalline rock. The slates are highly metamorphosed, and contain gold. From 10 to 15 per cent. of the inclosed walls is pyrites of iron. The veins are the results of thermo-chemical springs, the pyritic matter in the walls causing a precipitation of the precious metals. The claims mentioned are each 1,500 feet in length, by 600 feet in width, the limit established by Congress in 1872.

The preliminary development of these unquestionably very rich properties has fairly progressed. A lateral tunnel has been run, crossing the Garibaldi South 152 ft. from its mouth, and forming the line of division between this mine and the Andromeda. The Andromeda has been drifted on from this tunnel, a distance of 150 feet. From the surface of this latter mine a shaft has been sunk 75 feet. On the Pharis an adit level has been run over 300 feet. The width of the Andromeda and Garibaldi South veins is from 20 to 25 feet, that of the Pharis and Polaris five to seven feet. The ore of the Garibaldi South and Andromeda is composed of quartz gangue, thoroughly disseminated with galena sulphurets. The ore of the Pharis and Polaris is also heavily impregnated with sulphurets. These sulphurets are worth at the dumps \$200 per ton. Though many assays of the average ores give higher results, yet by regular milling process they will yield from \$15 to \$30 per ton free gold.

The Stanislaus River Gravel Company, to which these mines are adjacent, consists of 220 acres of rich mineral land situated on both sides of the Stanislaus river, and includes two and a half miles of the river bed. This portion of the Stanislaus river has never been flumed, although, according to estimates of Wells, Fargo & Co's express agents, its banks at this point have yielded over \$8,000,000. The banks of the river having proved so rich, careful tests were made to ascertain the value of the bed. It was found that the vast wealth it contained could only be reached by draining the water from the river. A magnificent canal, the result of Chicago capital and enterprise, has been constructed, capable of carrying from 8,000 to 10,000 inches of water per minute. This canal will furnish fully 500 horse-power at the north-west end of Andromeda and Pharis mines, and more than requisite power for the Garibaldi South mine. It will be able to carry all the water of the river seven or eight months of the year. It has been cut through solid metaphoric rock to the depth of 12 or 13 feet, thus keeping it from the action of high floods and making it as permanent a structure as solid rock can make it. The course of the canal is from Soldier's Gulch south, traversing the entire length of Dusty and Gravelly bars. Along this portion of the river the practical work of taking gold from the exposed bed and deeper bars will be commenced as soon as the river has resumed its normal dimensions after the spring floods.

From the great difficulty and expense of turning this river, and the danger from floods before sufficient time could be obtained to wash the dirt and remove the boulders, the bedrock of the channel has been rarely reached. But there is not an authentic instance where it has been reached that the results failed to prove highly remunerative.

At a place about three miles above "Dusty bar" this river was flumed for a distance of three fourths of a mile, and gold to the amount of between \$2,000,000 and \$3,000,000, taken out of the bed of the channel, as shown by authentic records. A short distance below "Dusty bar" an Italian, in the autumn of 1881, succeeded in draining the river for a distance of 40 rods. He claims, by his own labor only, to have taken from \$500 to \$600 per diem, and even then he had not reached the bed rock of the channel.

The Stanislaus Gravel Co. is a close corporation, and the owners have never asked one extra dollar from the investing public to aid in the enormous expense of placing this valuable property in a paying condition. In any part of the country it would have probably been impossible to keep an enterprise of such magnitude and employing so many people, from public curiosity. But the owners, aware of the present well-founded feeling of cautions in regard to all new mining enterprises, determined to do the most essential work necessary to the success of the undertaking by their own private means.

F. W. STRATTON.

Garibaldi Mine, Calaveras Co. Cal., March 6.

The Postal Telegraph.

The Rev. Sidney Smith once said, there was a kind of men into whom you could not introduce a new idea without a surgical operation; and he might have added, that when an idea was once forced into the heads of some men, they could not be delivered of it without trepanning. This class of men seem to think that nature made a mistake in placing the eyes in the fore part of the head. Rooted in the past, they look backward. It is so easy to run in ruts, so uncomfortable to be jolted out of ancient habits. This sort of conservatism, or slow-motioned sluggish thought, lies athwart every scheme of progress and improvement, like a colossal mountain range, covered with eternal frost and snow, and chilling the country thousands of miles on both sides. The enterprising Hannibals, who would scale the Alps of prejudice and unthinkingness, have always had to fight their way over ice, and hew a path through rocks.

When Sir Rowland Hill first proposed the reform of the postal system of England by the establishment of a uniform postage rate of one penny, a noble lord who was then Postmaster General of Great Britain, exclaimed: "Of all the wild and visionary schemes that I ever heard of, it is the most extravagant." All the paleozoic men came to his aid and said: "Let well enough alone. Let us have no erratic tinkering with the postal system. Where will the Government revenues come from if we adopt this reform? The projector, undismayed by the jeers and ridicule heaped upon him, continued to press upon the public attention facts, statistics and arguments, until Parliament was forced to give the matter a patient and impartial investigation. The reform was adopted after a hard struggle, and proved an immediate and triumphant success.

The happy results in Great Britain soon awakened public attention in America, but the paleozoic men were on hand and raised a formidable opposition. The conditions of this country and Great Britain are so unlike, they said, that no inference from her experience can be made favorable to the scheme. Great Britain is a small, densely populated country, while we have an immense territory that is very sparsely settled. The postal service cannot be kept up at reduced rates over these wide areas. But the scheme finally prevailed, and postage went down from twenty-five cents to three cents, and instead of injuring the revenues, as predicted, the transmission of letters was increased more than twenty-fold the first year, and the plan succeeded beyond the expectation of the most sanguine.

The wonderful discoveries of science wrought out new means of transmitting intelligence, and placed another responsibility upon law-makers to secure their advantage for the people. Here, again, Great Britain took the lead, and by an Act of Parliament purchased the telegraphic lines throughout the whole kingdom and made them an adjunct of the postal system, bringing the benefits of telegraphic communication within the means of the poorest.

But this blessing was not attained without another struggle. The corporation lawyers, the men of black-letter traditions and ancient precedents, and the keepers of the legal sepulchers talked long and loud about the stability of contracts, vested rights, and the danger of paternalism in government, and all that sort of thing. The example of England has been followed by France, Prussia, Switzerland, Sweden and Belgium, and everywhere the governmental control of the telegraph has proved a cheap, efficient and advantageous means of communication for everybody. The people enjoy the greatest facilities at rates that seem absurdly cheap to a people accustomed as we are to high telegraphic tolls.

Though the inventor of the electric telegraph was an American, though the people of the United States were the first to adopt this method of conveying intelligence, it seems that we are destined to be the last enlightened country to enjoy its full fruition. This question has been in Congress at intervals for the past 15 years, and yet nothing has been done. A bill was introduced in the House during the late session, but, like its predecessors, it was smothered in the committee room. There is no excuse on the part of Congress for delaying this reform. It is no experiment. The policy has been tried by other countries, and proved a great success. If a postal telegraph is a good thing in Europe—is found to save time and expense where railroads can carry the mail in a few hours from one border to another—how much more beneficent it would prove in a country so vast as ours, where the best locomotives in the world could not pass from one extreme to the other in less than a week.

IMPROVEMENTS IN BLAST FURNACES.—Only ten years ago a blast furnace which would make 400 tons of metal per week on 600 tons of fuel was considered a big thing. We have blast furnaces in Pittsburg which produce 1,500 tons of metal per week on less than 1,500 tons of fuel. The old method of heating permitted the flame to pass out of the furnace stack at a temperature of 3000° F. We are now using the regenerating stoves in Pittsburg, and do not let the gases out until we have utilized all the heat except 200°.

A State Bureau of Labor Statistics.

Following is the full text of the bill creating a Bureau of Labor Statistics, which has received the Governor's signature, and has become a law. The institution may be of very great importance to the class it is intended to benefit:

The People of the State of California, represented in Assembly and Senate, do enact as follows:

Section 1. As soon as possible after the passage of this Act, and every four years thereafter, the Governor of the State shall appoint a suitable person to act as Commissioner of a Bureau of Labor Statistics. The headquarters of said Bureau shall be located in the city and county of San Francisco, said Commissioner to serve for four years, and until his successor is appointed and qualified.

Sec. 2. The Commissioner of the Bureau, before entering upon the duties of his office, must execute an official bond in the sum of \$5,000, and take the oath of office, all as prescribed by the political code for State officers in general.

Sec. 3. The duties of the Commissioner shall be to collect, assort, systematize and present, in biennial reports to the Legislature, statistical details relating to all departments of labor in the State, such as the hours and wages of labor, cost of living, amount of labor required, estimated number of persons depending on daily labor for their support, the probable chances of all being employed, the operation of labor-saving machinery in its relation to hand labor, etc. Said statistics may be classified as follows:

First—In agriculture.

Second—In mechanical and manufacturing industries.

Third—In mining.

Fourth—In transportation on land and water.

Fifth—In clerical and all other skilled and unskilled labor not above enumerated.

Sixth—The amount of cash capital invested in lands, buildings, machinery, material and means of production and distribution generally.

Seventh—The number, age, sex and condition of persons employed; the nature of their employment; the extent to which the apprenticeship system prevails in the various skilled industries; number of hours of labor per day, the average length of time employed per annum, and the net wages received in each of the industries and employments enumerated.

Eighth—The number and condition of the unemployed, their age, sex and nationality, together with the causes of their idleness.

Ninth—The sanitary condition of lands, workshops, dwellings; the number and size of rooms occupied by the poor, etc.; the cost of rent, fuel, food, clothing and water in each locality of the State, also the extent to which labor-saving processes are employed to the displacement of hand labor.

Tenth—The number and condition of the Chinese in the State, their social and sanitary habits; number of married and of single; the number employed and the nature of their employment; the average wages per day at each employment, and the gross amount yearly; the amounts expended by them in rent, food and clothing, and in what proportion such amounts are expended for foreign and home productions respectively; to what extent their employment comes in competition with the white industrial classes of the State.

Eleventh—The number, condition and nature of the employment of the inmates of the State Prison, county jails and reformatory institutions, and to what extent their employment comes in competition with the labor of mechanics, artisans and laborers outside of these institutions.

Twelfth—All such other information in relation to labor as the Commissioner may deem essential to further the object sought to be obtained by this statute; together with such strictures on the condition of labor, past, present and the probable future of the same, as he may deem good and salutary to insert in his biennial report.

Sec. 4. It shall be the duty of all officers of State departments, and the Assessors of the various counties of the State, to furnish, upon the written request of the Commissioner, all the information in their power necessary to assist in carrying out the objects of this Act; and all printing required by the bureau, in the discharge of its duty, shall be performed by the State Printing Department, and at least three thousand (3,000) copies of the printed report shall be furnished the Commissioner for free distribution to the public.

Sec. 5. Any person who wilfully impedes or prevents the Commissioner or his deputy, in the full and free performance of his or their duty, shall be guilty of a misdemeanor, and upon conviction of the same shall be fined not less than ten (10) nor more than fifty (50) dollars, or imprisoned not less than seven (7) nor more than thirty (30) days in the county jail, or both.

Sec. 6. The office of the bureau shall be open for business from nine (9) o'clock A. M. until five (5) o'clock P. M. every day, except non-judicial days, and the officers thereof shall give, to all persons requesting it, all needed information which they may possess.

Sec. 7. The Commissioner shall have power to send for persons and papers whenever in his opinion it is necessary, and he may examine witnesses under oath, being hereby qualified to administer the same in the performance of his duty, and the testimony so taken must be filed

and preserved in the office of said Commissioner; he shall have free access to all places and works of labor.

Sec. 8. The Commissioner shall appoint a deputy, who shall serve the same time and have the same powers as the said Commissioner as set forth in the preceding sections; he shall procure rooms necessary for offices, at a rent not to exceed fifty (50) dollars per month, and may provide the necessary furniture, at an expense not to exceed five hundred (500) dollars.

Sec. 9. The salary of the Commissioner shall be twenty-four hundred (2,400) dollars per annum, and the salary of the Deputy Commissioner shall be fifteen hundred (1,500) dollars per annum, to be audited by the Controller and paid by the State Treasurer, in the same manner as other State officers are paid; there shall also be allowed a sum not exceeding five hundred (500) dollars per annum for stationery, and other contingent expenses of the bureau.

Sec. 10. The sum of ten thousand five hundred (10,500) dollars is hereby appropriated out of any money in the State Treasury, not otherwise appropriated, for the expenses of the bureau for the first two years after its organization.

Sec. 11. This act shall take effect and be in force from and after its passage.

Descending Shafts.

The Engineer-in-Chief of French mines, M. Haton de la Goupilliere, has lately called attention to an appliance, invented by M. J. Raffard, for facilitating the descent of miners into shafts up to 30 fathoms deep. A winch is placed at the mouth of the shaft, and provided with a rope, which makes two turns around the barrel; while a second rope, provided like the first, with a hook at each end, doubles the first by being hitched on to it. The miner who wishes to descend attaches a sack of sand, weighing about a cwt., to one of the ends of the winch rope and lets it down to the bottom of the shaft with the end of the second cord, which remains attached to it. He then passes the hook of his rope over a knot made about three feet from the end, and takes his seat by passing his leg through the loop thus formed, after having hitched on the loose end of the second rope. In this way an endless rope is formed, the difference between the weight of the man and that of the sack of sand remaining constant. The miner allows himself to descend slowly at first, keeping in his hands the two ropes; then, when the sack leaves the bottom, he lets himself go more quickly, but keeping the rising portion of the rope between his legs. As he nears the bottom he slackens the pace, seizes the rising rope with his hands and brakes himself till he stops; and then he attaches, by its end, the rope he is upon, so as to keep the sack suspended. When he wishes to reach the surface again he takes his seat as before, pulls on to the second rope, to which the sack is attached, and, by exerting an effort only slightly greater than the difference between his weight and that of the sack of sand, he rises easily at a speed of about two and a half feet per second. When 10, 20 or more men want to descend at once, two men go to the handles of the winch and let down the miners one by one, each taking care to keep the second or safety rope within reach for holding on to in case of accidents. When only three men, including those at the winch, remain to go down, the last but two attaches a weight of 66 lbs., consisting of coal or ore, to the end of the rope. The last man but one descends, aided by the last man at the winch; arrived at the bottom, the former hitches the second rope to the end of the winch rope and hangs the cwt. sack to the hooks, when the last man descends in the manner already described.

Seasoning Wood.

Wood requires time in which to season very much in proportion to the density of the fiber. But this rule is not without an exception, for pitch pine, which is not at all a densely fibered wood, requires a long time in which to season, even when the process is conducted under favorable conditions.

This occurs in consequence of the resinous character of pitch pine, the resin clogging the pores of the wood and thus stopping up the channels through which the moisture would otherwise exude. There are some woods—and mahogany, ebony, and some other of the tropical woods are of the number—that even in their living state contain very little moisture.

Plants that are of slow growth contain less moisture when in a living state than do those whose growths are rapid. A mahogany tree requires 500 years in which to mature, and, as a consequence, its texture is exceedingly dense. Being dense in texture, it requires a long time to properly season, and during that lengthened period it shrinks very little. Mahogany should not be kept longer than necessary in the log, because inasmuch as the outside portion of a log contains the greatest amount of moisture, and it being the exposed part, it will, as the wood dries, shrink more than the inner wood, and so, to allow for the outside shrinking, outside shakes will and must occur.

The same remark applies with equal force to all log timber, but we name the circumstance in connection with mahogany particularly, for the reason that it is a general practice for some to keep their mahogany logs for a long time in an unsawn state.

MECHANICAL PROGRESS.

Invention Helps Labor.

The evidence is cumulative of the fact that invention and the multiplication of machinery creates an increased demand for labor, instead of having the opposite effect, as is held by many. One invention, or one new machine, opens the way for another, and either very often calls into existence an entirely new trade. Our contemporary, the *Wood Worker*, speaks of the scroll saw, a very simple instrument, but one which nevertheless has made room for quite a large business for its own manufacture, besides creating many new wants, which calls for an outlay of labor, which would never have been needed had it not been for that little invention.

These saw blades are often of a mere ribbon-like thickness, with teeth invisible to the eye, and perceptible to the touch only. As a dozen blades are supposed to accompany each of the 200,000 machines already in existence, that would have called for the manufacture of over 4,800,000 blades; and as each sawyer requires them by the dozen, if not gross, owing to their liability to break, the number manufactured is simply amazing. The low price at which they are produced, is, however, still more astonishing, considering the work required of them. The demand for scroll-saw patterns also keeps busy a large number of men. Then the demand for fancy woods created by the popularity of the scroll saw is something stupendous, firms having to send their orders at least six months in advance to secure a stock. The saw mills receive the woods in the log from the different sections where they grow. For fancy scroll sawing, Central and South America supply the rosewood, tulipwood, cocobola, amaranth and satinwood, and Mexico the mahogany and Spanish cedar. White holly, walnut, oak, and ash are domestic woods. The woods are sawed on veneer saws, and, after drying, are planed to the required degree of thickness, sometimes to one twenty-fourth of an inch.

A COTTON-PICKING MACHINE.—There appears to be a strong probability that the long sought for machine that will do away with the expensive outlay of labor heretofore required for gathering the cotton crop, has at last been realized. Mr. Ransom, statistical agent for South Carolina, describes a cotton-picking machine, and believes, from its success in a recent field trial, that the inventor, Mr. E. B. Hazleton of Charleston, has solved the problem of picking cotton by machinery. The implement somewhat resembles a long wagon on two wheels, from whose nave motion is conveyed by a chain hand, horses or mules furnishing the motive power. The pickers are toothed steel disks revolving between two wooden disks; the latter prevent unopened bolls, foliage, etc., from entanglement, while the fibers of the blossom, dropping even but slightly between, are caught, drawn entirely in, and taken cleanly from the boll by the teeth of the swiftly turning metal. A revolving brush removes from the teeth the fibers, which fall upon an endless apron and are conveyed to the body of the machine. As the machine moves forward, a V-shaped device converges the plants to the pickers. The shaft on which the latter revolves is inclined in such a way that the blossoms at any distance from the ground are reached. Motion is also conveyed to brushes on the front of the implement, by which sand and dust are removed from the plant. If the above machine proves a practical success, it will be almost as important to the cotton industry as was the invention of the cotton gin.

IS PAPER TO BE THE RAIL OF THE FUTURE? This question is seriously asked by the *Boston Journal of Commerce*, and answered by that paper as follows: It is well known that one of the best materials for car wheels is paper. It is now stated that paper can be utilized for the manufacture of rails, in place of steel, which has almost displaced iron. It is said in favor of the new material that the cost per mile will be less by one third than that of steel, and it will last much longer, being almost indestructible. There is no expansion or contraction from heat and cold, consequently no loose or open joints; and, being so much lighter than steel or iron, the rails can be made longer and connections perfectly solid, making the road as smooth as one continuous rail. The adhesion of the drivers of the engine to this material will be greater than that of steel, consequently the same weight engine will haul a larger load. There will be a great saving of fuel, and the smoothness of the rail will lessen the wear and tear of rolling stock. The rails are made wholly and entirely of paper, and so solid that the sharpest spike cannot be driven into them. The action of the atmosphere has no effect on it, will neither rust nor rot, and, with paper wheels and rails of the same material, our palatial trains will glide over the prairies at the rate of 60 miles an hour with as little jolt and jar as on an ocean steamer.

SHAFTING is continually getting out of line or of level, from one cause or another; the walls of the building may settle, or the floor may be depressed in one spot by an unusual weight; a heavy strain by a belt may cause the cutting of a box and consequent derangement of a line. Frequent periodical inspections should be made to readjust bangers and brackets, if necessary, and to ascertain if there is undue strain on any particular portion. Neglect of these duties will surely cause waste and expense.

Torsion Tests of Cast Steel.

Some very careful tests have been recently made, to ascertain the relative resistance to torsion of tool cast steel in its unannealed form, as it comes from the manufacturer and is cut off the bar; also in its annealed condition; and as hardened for tool purposes to be used on iron, taps, reamers, drills, and similar tools that are worked by torsion.

It is not generally supposed that hardening and tempering cast steel increases its torsional resistance, on the contrary it is usually accepted that resistance to torsion depends mainly on toughness—the coherence of fibers when twisted—and that this toughness is much diminished by the process of hardening. But in the tests to which reference has been made, from a number of different manufacturers, the specimens that showed the least torsional strength, when hardened, were yet one and a half times stronger, or resistant to twisting, than unannealed specimens from the same brand. To be more exact, the figures for the unannealed were 5,114, the annealed 5,166, and the hardened 7,596, being an increase in torsional strength of the hardened and tempered specimens over the annealed and the unannealed of more than 33 per cent.

Other specimens—those of different brands—showed a still wider difference between unannealed and hardened conditions: as of 5,010, unannealed, and 8,418, hardened; 5,346, against 8,814; 5,124, against 7,920; and of 5,100 against 8,232. These figures may represent pounds, as they actually did in the tests, the pieces tested being of round steel minus five-eighths of an inch diameter, with a distance between shoulders of two and three eighths inches. The hardened specimens had been hardened and then drawn to a straw color, leaving them as hard as any tempered tool used for working metals, and inferior only to the file, which is not tempered, or drawn, at all.

One of the peculiarities of the tests was that so light a difference existed between the torsional strength of unannealed steel and that which had been carefully annealed 24 hours, the results showing slightly in favor of the specimens tested as sent directly from the bar. The following shows the comparison:

Unannealed.....	5,514	5,610	5,346	5,124	5,100
Annealed.....	5,166	4,572	4,864	4,128	4,552

From this it appears that no increase of toughness, or of resistance to torsion, comes from annealing cast steel. But annealing is valuable in rendering the steel more amenable to the action of the cutting tool.

A CONTINUOUS STEAM ENGINE RECORDER.—A machine has recently been patented in England, and has also been introduced into this country, by which an accurate record is kept of the time of starting and stopping of an engine, with the variations of speed for every minute. The device is very simple and requires but little attention. The clock work has to be wound up only once a week. The record can be taken off by any office boy, and the device can be placed at a safe distance from the boiler, so as not to fail in its report of everything connected with any accident, etc. As an evidence of what it will do we copy the following: A gentleman having one of these instruments in use says: "I had had my clock at work a few days when I was one morning surprised to find it making a singular figure. I went to the engineer and asked what was wrong with the engine? He did not know that anything was wrong. We counted the strokes and found the speed right, viz., 30½ strokes per minute. But, said I, some moments it is running at 31, and other moments at 30. Last night when you stopped at 5:30 it was running all right. What have you done to the engine since? He said he had packed the throttle valve. I found upon examination, that the packing was too tight, and that the governor-balls had not the power to move the valve spindle until they had attained a considerable increase or decrease of speed. We stopped the engine, eased the packing, and started again, and it is duly recorded, and may be seen now, the day, hour and minute we stopped, together with the improved performance of the engine after restarting."

MOLECULAR STRUCTURE OF METALS.—It is generally thought that the crystalline structure does not exist in metals which have been drawn or rolled. M. Kalischer has undertaken a series of experiments with cadmium, tin, copper, iron, steel, etc. He has arrived at the conclusion that the crystalline state corresponds to the natural molecular structure of metals. This state may be modified more or less easily by mechanical labor, but it is commonly re-established under the influence of heat. In some metals which have been drawn into wire the heat, while re-establishing the crystalline structure, increases at the same time the electric conductivity.—*Chron. Industr.*

THE NEW NAIL MAKING.—We have already, in these columns, made quite full reference to the proposition of the nail makers in Wheeling and Pittsburgh to hereafter employ mild Bessemer steel instead of puddled iron in the manufacture of nails. It is now said that Bessemer steel nails, to do the same work, will not weigh much more than half as much as those made of iron, and furthermore, that a Pittsburgh mechanic has invented a machine that will cut them more than twice as fast as the machines heretofore in use.

SCIENTIFIC PROGRESS.

Ancient Mode of Baking Walls.

Among the recent discoveries at Hissarlik, by Dr. Schliemann, are the remains of buildings which he supposes to have been temples. Nothing, he says, could better prove the antiquity of the buildings than the fact that they were built of unbaked bricks, and that the walls had been baked after they were laid up, by huge masses of wood piled up on both sides of each wall and kindled simultaneously. Each of the buildings has a vast vestibulum, and each of the front faces of the lateral walls is provided with six vertical quadrangular beams, which stood on well-polished bases, the lower part of which were preserved, though, of course, in a calcined state. Dr. Schliemann maintains that in these ancient Trojan temples we may see that the *auto* or *parastates*, which in latter Hellenic temples fulfilled only a technical purpose, served as an important element of construction, for they were intended to protect the wall ends and to render them capable of supporting the ponderous weight of the superincumbent crossbeams and the terrace. Similar primitive *auto* were found in two other edifices, and at the lateral walls of the northwestern gate. It was also discovered that the great wall of the ancient Acropolis had been built of unbaked bricks, and had been baked like these temple walls. According to Dr. Schliemann, a similar process of baking entire walls has never been before discovered, and the *auto* in the Hellenic temples are nothing else that reminiscences of the wooden *auto* of old, which were of important constructive use.

Analyzing Blast Furnace Gases.

Mr. J. E. Stead, F. R. S., recently read a paper before the North of England Institute of Engineers on a new apparatus designed by himself for analyzing blast furnace gases. The apparatus is in two portions—one portion being used for collecting samples of gas from the mains, and the other portion for dealing with it in the laboratory.

After describing his device, Mr. Stead gave some valuable information in regard to the operation of blast furnaces. Among other things, he stated that during the production of one ton of pig iron combustible gases weighing nearly seven tons pass off from a Cleveland blast furnace, and that the calorific power of these gases is equal to that furnished by the combustion of 11½ hundredweight of coal. In the production of one ton of pig iron, five and a half tons of air are forced into the furnace, and the combustible gases drawn off from the top of the furnace require four and three fourths tons more air to complete their combustion. The total final products of combustion weigh 11½ tons, and these pass into the atmosphere as waste gases. Mr. Stead advocated strongly the systematic examination of blast furnace gas, stating that he had occasionally detected that one third of the combustible gas produced was passing into the atmosphere unconsumed. This was equivalent to throwing away about 70 tons of coal per week for each furnace producing 400 tons per week of pig iron.

Mr. Stead, read another paper at the same meeting as above. "On a Rapid Method of Estimating Phosphorus in Iron." He described the old method of testing for phosphorus, which occupied two days for each estimation. He then explained a new plan he had devised, whereby the same results can be obtained in two hours. In testing for phosphorus in basic steel, there is a special advantage in dealing with such material because it contains no silicon, and under such circumstances the phosphorus can be determined in a single hour. The principal saving of time arises from the absence of any necessity for artificial drying.

THE LATEST ELECTRICAL DISCOVERY.—The Rev. Mr. Gilbert, during an address at Christ church the other night, remarks the *Otago Times*, while speaking of the telephone, asked his audience if they would be astonished if he were to tell them that it was now proved to be possible to convey by means of electricity *vibrations of light*—to not only speak with your distant friend, but actually to see him. The electroscope—the name of the instrument which enabled us to do this—was the very latest scientific discovery, and to Dr. Gndrah, of Victoria, belonged the proud distinction. The trial of this wonderful instrument took place at Melbourne on the 31st of October last in the presence of some 40 scientific and public men, and was a great success. Sitting in a dark room, they saw projected on a large disk of white burnished metal the race course at Flemington with its myriad hosts of active beings. Each minute detail stood out with perfect fidelity to the original, and as they looked at the wonderful picture through binocular glasses, it was difficult to imagine that they were not actually on the course itself and moving among those whose actions they could so completely scan.

PHOTOGRAPH OF THE LATE COMET'S TAIL AND STARS.—Dr. Gill, at the Cape of Good Hope, succeeded in photographing the comet's tail, and with it 50 stars that were seen through the tail. The plate was exposed 140 minutes, and was kept up to the motion of the earth by clock-work.

Electricity in Mills.

It is well known that the electricity generated by the machinery of some manufacturing establishments is a source of great annoyance, and sometimes of positive evil. Hence it may be interesting to learn that a means has probably been devised which will free the machinery in mills from electricity which is thrown off from the belts. At the suggestion of Edward Atkinson, of the Boston Manufacturers' Insurance Company, says the *Boston Journal of Commerce*, F. W. Whiting has made a study of the subject, and has in operation at the office of the company his device for collecting this electricity and discharging it to the earth. The principle employed is that of the Leyden jar. The machinery is connected by a No. 18 copper wire in a circuit, and this circuit is connected with the gas and water pipe, and thereby with the earth. The machinery is discharged by this wire. As the belts are generating the electricity and throwing it out constantly, a collector, as it is called, is arranged in front of the belt and picks up the fluid, which is also conducted to the earth. In other words, the earth, being the great sponge for the electricity, it seeks that home rather than to attack the machinery. In the exhibition of the principle on a portion of a spinning frame, the cotton fiber is highly electrified, but on attaching the collector it is entirely discharged. Where the collector is applied to a speeder there is none of the annoyance so common in that portion of the card room. In applying this principle to the woolen cards it will probably be to arrange a conductor that will take the electricity from the surface of the condenser and into the iron frame, and from there to the earth. Mr. Whiting intends suggesting a form of appliance for different kinds of machinery. The device is now in use, and will not be patented, and, furthermore, the inventor offers to give all necessary information as to the manner of the construction and use of the device.

AN OBSERVATORY FOR OAKLAND.—An observatory for astronomical observations will be erected in Oakland by W. H. Jordan, who expects that the structure will be completed and the instruments in place by September. The tower will be 40 feet high, surmounted by a revolving dome of galvanized iron 12 feet high, with clock attachment and micrometer for the purpose of regulating the movements. A brick pier 47 feet high will run through the center of the structure to insure a firm foundation for the telescope in the dome. The telescope has been ordered to be made by Alvin Clark & Son, of Cambridge, Massachusetts, at a cost of \$3,000. The instrument will have a barrel 10 feet in length, with an object glass eight inches in diameter. The diameter of the object glass in the Davidson observatory is six and one fourth inches. The plans for the observatory were shown to Prof. George Davidson, who says that this plan fulfills all the essentials required for mounting, using and protecting the proposed equatorial telescope, transit, etc. Until the Lick observatory is completed the proposed Oakland observatory will be the most complete affair of the kind on the coast. The money for the observatory and the contents is subscribed by a gentleman of Oakland, who prefers that his name remain unknown for the present. One condition of the gift is that the observatory be located on some public square.

ANCIENT MANUSCRIPTS.—Many ancient manuscripts of untold value are believed to be stored away in the monasteries of Greece. A loss that will never be understood to its full extent has just been sustained in the destruction of the monastery of Vatopedi, which took fire through the carelessness of one of the monks, and, in the absence of any appliance for extinguishing the flames, was speedily burned to the ground. Several thousand Byzantine manuscripts were consumed in this fire. To prevent such irreparable losses in the future, the Greek Government has sent two Athenian professors, Findiklis and Kalogeras, who are experts in deciphering old manuscripts, to examine the libraries and archives of the monasteries, and to send such manuscripts as they find of value to the national library in Athens. These gentlemen report that they have already discovered a great store of parchment treasures in the monastery of Dusiko, among them some of ancient Greek authorship. It is said that they have found an unquestionable tragedy by Eschylus and one by Sophocles.

REASONING ANIMALS.—We confess that the two points which have always struck our mind as distinguishing the nature of brutes from that of men have been their inability to worship God and to kindle a fire. It would be folly to deny that brutes could reason. A sheep dog who wants to head a band of sheep in a narrow lane will jump over a wall and run along the other side until he has reached the exact spot occupied by the sheep at the head of the flock, and then jump back in order to drive them home. A colley who was fond of going out with a carriage, would go and hide himself as soon as he heard the order for the carriage given, so that he might not be tied up. If we analyze these and many other instances of sagacity, we cannot help admitting that a brute's mind is capable of two or three steps of reasoning. On the other hand, no animal ever manufactured a tool or weapon, even of the simplest kind; and it is doubtful whether a gorilla himself, supposed to be our nearest neighbor, uses a walking cane.—*London Spectator*.

100 ft, showing a fine vein of ore in the bottom, 20 inches wide. It is the intention to sink 30 ft more and then commence drifting on the ledge.

FROM DEEP SPRING.—N. Gilbert and Billy Hedge were in town to-day, from Deep Springs district, laying in supplies. Mr. Hedge speaks in the highest terms of the general prospects out that way.

THE ELGIN MINE.—This mine was located in the Nevada district about one year ago. It is situated eight miles north of the Keynote mine, and about 16 miles from Independence. No work of any consequence has been done on the claim until a short time ago, when the locators, Messrs. Baker, Barnes and Keyes, commenced operations. The vein is very favorably situated for working both the mine and ore, being within one and a half miles of plenty of water and wood. The ledge shows itself on the surface for a distance of 1,000 ft, and, at the point where work has been commenced, the vein shows a width of three ft of rich gold quartz.

MARIPOSA.

PROSPECTS BRIGHTENING.—*Gazette*, March 10: The prospect of the Hite Gold Quartz Co., resuming work and going ahead again as formerly appears fully assured. According to a mortgage filed here in the Recorder's office on the 8th inst., the company has secured a loan of \$150,000, which is secured by bonds payable three years from date with interest at 6 per cent. The mortgage recites that this loan is made for the purpose of "securing the debts heretofore contracted or which may hereafter be contracted." This would seem that the dark cloud which has for some time past been hovering over Hite's Cove and the mines therein has been dissipated, and sunshine of prosperity once more beams upon that locality.

PLUMAS.

CRESSENT MINE.—*Greenville Bulletin*, March 10: The work of getting up the new hoisting machinery is progressing rapidly; the unusual character of the present season has led to a change in the original plan; at first it was intended to arrange for hoisting with water power alone, but now either steam or water can be used as circumstances may require. This change has been made with very little outlay over the original estimate; the course having been determined upon before the work had been so far toward completion as to render much alteration necessary; the shaft will be sunk to a total depth of 500 feet, with levels run from each successive depth of 100 feet.

CHEROKEE MINE.—Cherokee stock is still quoted in New York; why it should be quoted at all is one of those things that no fellow can find out. With everything movable sold and taken away, the mine in its present condition is not worth two cents per share; it is quoted at six.

SAN BERNARDINO.

SUE.—*Calico Print*, March 10: Work is progressing on this fine claim. They have run a drift in 15 ft, the ledge measuring four ft. Besides the large quantity of first class ore already taken out and shipped to San Francisco they have 300 sacks of second class ore ready for the mill. The rich ore body of nearly solid black metal which they have struck continues to hold out, and the indications are that there is an immense quantity of the same quality of ore in the ledge, enough to yield a fortune to all the parties interested.

LITTLE WATERM N. owned by Robt. Anderson, and situated below the Sue. Work was commenced on this claim several days ago, and the ore taken from it is exceedingly rich.

THUNDER.—Mr. Knox is now working on this mine, and is taking out very fine ore, which resembles that of the Little V.

ENCHERQUER.—This claim was recently opened by the Briesen Bros., and is looking very favorable. They are taking out some fine ore, similar to that of the Occidental.

BLUTCHER.—Owned by Swain & Bland, and is situated about one and a half miles from town. Ten men are at work on night and day shifts running a cut, which is 40 ft long, and sinking a shaft, down 37 ft. Ledge matter five feet wide. Thirty-five tons of good ore sacked. This claim is a fine prospect.

SILVER KING.—Connection has been made between the winze level and the summit winze, making a clear way at the west end. The Cunningham shaft is now down 150 ft. They will be shipping about 25 tons a day in about two weeks. Every thing is progressing finely in the mine, and the ore assays average well.

SALE.—The Pioneer Quartz Mill at Hawley's Station, owned by Sherman & Somer, has been bought by the Silver Odessa M. Co.

ORE AND BULLION SHIPMENT.—The amount of ore and bullion shipped from this point is constantly increasing. Last Tuesday 22 tons of first class ore were shipped from the Oriental mine, 20 tons from the Garfield, and 20 tons from the Humburg. The same day 337 pounds of bullion were shipped from the Pioneer mill, at Hawley's Station, valued at \$5,000, being the returns of the Silver Odessa ore. The ore from this mine mills \$95 to the ton. Nine sacks of bullion passed through this station from Providence, its destination being New York city. They weighed about 1,200 pounds, valued at about \$16,000.

ELLENBURG.—The mines in this locality are looking unusually well. Two men are prospecting for ore on the Snow Bird with good success. The Cuba boys are feeling elated over the millings of their last ore, which went beyond their expectations, and are now taking out ore on the Triangle. The Mary Bell is progressing under the supervision of Messrs. Childs & Roberts, and bids fair to be one of the bonanzas of the camp. The San Houston No. 3 is still being worked and is looking well. We saw some very rich ore brought from San Houston No. 1 by Messrs. Sweetzer, Richardson & Wilkinson, who report it the biggest strike ever made in this camp. We will now pass over the hill to where we find John McBride with four men working on that rich prospect, the Plutarch, which is turning out the blue silver in considerable quantities. The Taggart mine is working four men and still continues to show that beautiful red and blue silver and every indication of a first-class mine. As we go down the canyon on our way home we find Mr. Askew digging out ore on the Neveweat. On the whole we have no reason to complain of our outlook.

SIERRA.

A NEW DEPARTURE.—*Sierra Tribune*, March 8:

The determination of the Harlem M. Co. to erect chlorination works at their mine, is a move in the right direction. It is a well known fact that, what to-day are some of the best paying mines in Nevada county, were a constant drain on the pockets of stockholders until the method was adopted of saving sulphurets, and by building their own chlorination works reduced them at a small cost, thereby adding largely to the gold yield. Quartz miners in this county stick to the "old way" with a wonderful degree of pertinacity. It is only an exceptional case where ore is found that will give its full yield by the ordinary amalgamating process, and strange as it may seem, the new methods of working gold ores, which have been introduced with such grand success in adjacent counties, have never had a trial in Sierra county. A mine like the Harlem, that gives a yield of five per cent. in sulphurets, valued at \$500 per ton, is certainly badly managed when the sulphurets are allowed to run to waste, as has been the practice for several years past, or, in fact, since the mine was first opened. However, the present managers of that property are going to work in the right way, and we believe that the new departure will not only add largely to the value of the Harlem mine, but will give a greater value to the whole quartz interests of our county.

GOOD ROCK.—T. H. Smith was over from Alleghany last week. Mr. Smith had with him some samples of ore recently taken from his mine, the Osceola, located on Kanaka creek. The quartz exhibited was very rich in free gold, and of the same character as rock taken from some of the wonderful bonanzas developed in that section during the past few years. Mr. Smith is now engaged in running a tunnel to the ledge 25 ft below the croppings. This tunnel is expected to open up a fine body of ore.

TUOLUMNE.

NEW CLAIM.—*Tuolumne Independent*, March 10: A new claim is being opened and worked by Messrs. Hardy & Rushing, in the neighborhood of Saratoga Diggings on a spur of Table Mountain—the lead being one of two that ran in and swelled the grand channel near Mountain Brow. They have tapped the diggings by a tunnel—the channel being about 20 ft wide. The diggings are good for \$5 per day per man.

A new quartz mill is on its way from San Francisco to the "Oakland" mine, which is situated in the neighborhood of Nate Arnold's mine, above Columbia.

Nevada.

WASHOE DISTRICT.

UNION CON.—*Enterprise*, March 8: The joint Sierra Nevada east crosscut on the 2000 level is being extended at the rate of 25 ft per week. The face is now in softer material, and streaks of quartz giving low assays are again being cut. The joint Mexican east crosscut on the same level continues in favorable vein material, carrying occasional stringers of low grade quartz.

OHMIR.—The station at the 3000 level is being lengthened some feet, in order to give more working room, and a crosscut will be started east next Monday.

MEXICAN.—Good headway is making in the joint Union Con. east crosscut on the 2000 level. The face is in vein material showing occasional feeders of quartz.

SIERRA NEVADA.—A chamber for a pump is being cut out on the 2700 level, and the east crosscut on this level is being timbered up.

HALE & NORCROSS.—The joint Savage north drift on the 2600 level is again cutting seams and bunches of quartz giving low assays. It now has less than 100 ft to go to reach the south line of the Savage.

SAVAGE.—The north drift on the 2600 level, joint with Hale & Norcross, is making good headway, and is in a favorable formation. Feeders of quartz are again beginning to be cut which show some metal.

CALIFORNIA.—Joint Ophir east and west crosscuts have been commenced on the 2900 level.

POTOSI.—Day before yesterday the drill tapped a strong flow of hot water in the face of the main south drift on the 2600 level. The hole was plugged up, and the drift turned more to the east.

CON. VIRGINIA.—Good progress is being made in the southeast drift on the 2500 level, though it is wet and very hot at the face. There has been no increase of water since the resumption of drifting.

YELLOW JACKET.—The water is again rising slowly at the new shaft. At the Winter's shaft over 70 tons of ore per day are being raised. Some paying ore is being found in the prospecting drifts.

NORTH GOULD AND CURRY.—The usual progress is being made in the west crosscut on the 2500 level and the material encountered is growing more favorable in appearance.

UNION SHAFT.—The new pumps are working well and smoothly. The retimbering of the tank station at the 2300 level is about completed.

ANDER.—The west crosscut is in a mixture of quartz and porphyry. The raise from the east drift is yielding some low grade ore.

UTAH.—The west crosscut on the 1300 level is being extended at the rate of about 25 ft per week. The ground continues dry.

ALTA.—Good headway is making in the drain drift that is being run out to connect with the south branch of the Suro tunnel.

BERNICE DISTRICT.

LAVELY CAMP.—*Battle Mountain Messenger*, March 8: From parties just in from Bernice District we learn that the prospects are flattering for a lively camp at that place during the coming summer. The ledge has been stripped in the tunnel about 200 ft and shows up well. Two tunnels will be started right away to cut the ledge at a greater depth than the present workings, the lowest one tapping the ledge at a depth of over 300 ft from the present workings. The Starr-Grove mill being hauled from Lewis to the new camp will be running inside of two months. Wood and water is plenty in the vicinity and the ore free milling, averaging about \$60 per ton. The cost of mining and hauling to the mill is small, and we look for Bernice district to become a large bullion producer in a short time.

THE ROAD.—*Silver State*, March 10: In view of the fact that Bernice district is likely to be a lively camp and producing considerable bullion at an early

day, our citizens are contributing to a fund to be used for repairing the road. Bernice is situated a few miles east of the Humboldt salt marsh, almost due south from Winnemucca. There is a natural road down Grass and Pleasant valleys to the mines, no mountains intervening. Teamsters say there are a few places on the road, where mountains streams wash out gullies at this season of the year that ought to be repaired, and then the road will be as good as any of equal length in the State.

CHERRY CREEK DISTRICT.

THE SITUATION.—*White Pine News*, March 10: Since our last there has been little or no change, so far as people here know, in the Star affairs. At one time this week the engineers and pump men quit and the works were closed down, leaving the pumps where they were. After a time other counsels prevailed, the machinery was put in motion with the view of raising the pumps and leaving the mine in the best condition possible. This, we are informed, was accomplished yesterday, and the mine abandoned. So far no intimation has come from San Francisco as to what the company proposes to do, if we except a letter from Gen. Williams in which he stated that for the past five years he and his company had lost a great deal of money here, and now that our people might share a part of the loss. This is consoling, for the people who have been carrying that company had made millions out of the Star; we wonder if Mr. Williams would be so generous as to divide with our people? We think not.

LOOKS WELL.—Miners tell us that at no time within the past four years have the lower levels of the Star mine looked so well as at present, and they cannot conceive how any crowd of sane men could act so foolishly as to permit so promising a piece of property as the Star to fill up with water and go to destruction. But it is the mandate of the powers that be, and if they can stand it, surely other people ought to be satisfied, provided they pay up what they owe. But this is just what the managers of the Star are trying to evade. To us the matter looks like the man who is said to have cut off his nose to spite his face. "Whom the gods would destroy they first make mad," is of heathenish philosophy, but very applicable to the Star management.

COLUMBUS DISTRICT.

NORTHERN BELL.—There is an improvement in the face of the east drift from the bottom of the winze from the fifth shaft level. The drift has been extended 10 ft, and is showing 18 inches of high grade sulphurets in the face. A new development has been recently made near the top of the hill, having opened into some good ore which is now showing a width of four feet. The daily output of ore has been about 70 tons, which is easily handled by mill No. 2. The total shipments of bullion, on February account, amount to \$91,191.93. The production on March account, to the 8th inst., was \$10,782.75.

MOUNT DIABLO.—The intermediate drift, below the third level, and west of winze No. 1, is yielding several carloads of \$65 ore daily, from bunches in a large ledge of low grade ore.

JACK-RABBIT DISTRICT.

LOOKING WELL.—*Pioche Record*, March 10: The claims in Jackrabbit District are now looking better than they have at any previous period. The claim owners are all assiduously working their mines, and during the past two weeks ore has been uncovered in several claims.

TAYLOR DISTRICT.

NEW STRIKE.—*Eureka Sentinel*, March 10: A large body of high grade ore has been struck in the Monitor and Gore, in Taylor District, on the north side of the ravine, says the *Reflex*. Two drifts have been run just inside of the boundary lines of each claim, and both are in ore, top, sides and bottom. The drifts start from a point common to both, but diverge, one going into the Monitor ground and the other into the Gore. The new strike is well calculated to brace up mining property in Taylor District at a time when it does not stand particularly in need of it. Taylor is one of the few mining districts that is destined to come to the front on its own merit.

Arizona.

ITEMS.—*Tombstone Republican*, March 8: The Lima Con. is taking out good ore, and the lower levels look fine. The Vizina continues on the even tenor of its way, making its regular shipments of ore to the Boston mill. At the Emerald, work putting on a collar on the shaft is nearly completed, and sinking will begin in a day or two. The Sidney has resumed work, and will push its crosscut west to intersect the Grand Central west ledge in its south mine. The boilers are set for the pumping works at the Grand Central, and the stations and tanks for the pumps are nearly complete. They are now waiting on the machinists in San Francisco. The ore yield of the Ingersoll is more now than at any previous time in the history of the mine. The hoisting works enable them to handle the output to far better advantage than they could do with the whim which they used to develop the mine. The Prompter shaft is down 330 ft, with a crosscut 12 ft in the ledge, with better indications than heretofore. The next work will probably be a level run along the ledge to the west, toward the old shaft, when it is believed a large body of good ore will be developed.

Colorado.

WATTS.—*Georgetown Courier*, March 10: A force of 8 men have commenced operations on the Watts lode, near the Shively.

BRUCE & DAVIES have leased the Mammoth mine, on Sherman mountain. The mine contains large bodies of low grade ore, and small quantities of a high grade.

ORE.—Large bodies of ore have recently been encountered in the Donaldson mine. The mill is fast assuming shape, and a portion of it is under roof. The framework of the tramway from the mill to the mine is completed.

THE CALYPSO lode, which is situated on the log-back between Gray's Peak and McClellan mountain extending from the Horseshoe into West Argentine is owned by Mr. Hewitt and others. They propose building a trail to the Stevens ore house, to which place the ore will be packed, then hauled. The lode carries a large body of galena.

GRIFFITH.—That portion of the Griffith mine, formerly owned by the Wilson & Cass Co., consist-

ing of 700 ft, is now being worked by J. E. Johnson & Co. They are driving two levels from the north side of the shaft. The lower level is 170 ft deep from the mouth of the shaft, the other about 100 ft. There is a fine body of ore in the lower levels being from 8 inches to 3 ft in width. A trial lot of nine sacks was run and yielded \$53.90 net. It looks like old times to see the tramway in operation.

Idaho.

REPORTS FOR SALE.—*Wood River Times*, March 7: There is a report in circulation in town that the Mayflower, Jay Gould, Bullion and other mines are all sold to an English syndicate, which proposes to employ every miner they can get room for in actively developing the properties this summer. It is now over one month since the agents and experts sent here by the English syndicate left Wood River. They were thoroughly experienced gentlemen, and after carefully examining the mines some three weeks, were so favorably impressed with their value that it was asserted at the time that the sale would be concluded. The information now received is believed to be authentic, and this pending negotiation was the cause of the late inactivity of the mine managers at Bullion. The Mayflower and Jay Gould never showed so well as at present. The workings have recently opened very large bodies of high grade ore, and should the mines now change hands at the prices named, it is an assured fact that, instead of being worked hereafter for a sale, they will be worked for product and profit. This change of programme will be of the utmost advantage to Hailey and the entire Wood River country, in the employment of, as is estimated, 1,500 miners, and in increasing the bullion shipments to such an extent as to prove Wood River what all resident mining men are now quite well satisfied it is, to-wit: the most extensive, as well as profitable, region for mine investments in the United States.

FOUR STRIKES IN ONE DAY.—Not only was a body of high grade ore struck, yesterday, in the Jay Gould, but also in the lower workings of the Mayflower, and Bullion camp is greatly elated thereat.

SALE OF THE QUINBY HILL MINES.—Colonel Broadhead has negotiated in New York, to a syndicate, the Quinby Hill mines, which were owned by J. C. Anderson, of Eagle Rock, Col. Broadhead and others. The mines are 40 miles north from Hailey, on the mountain summit two and a half miles northeast of Galena, and are above the timber line. Considerable very rich ore has been extracted, and some shipments made last year to the Hailey sampling works prove it high grade. Work will be opened with ample capital.

THE Royal Gorge and the Silver Ledge mines have been worked all winter under the superintendence of Mr. J. B. Hewitt. The ore has been carefully stored away, and as soon as the snow leaves, there will be many tons ready of shipment. At the Royal Gorge there are over 100 tons that will run 150 ounces silver, 6% copper and 2 ounces gold. At the Silver Ledge are 400 tons of galena that will run from 60 to 160 ounces silver, and will average 50% lead. The Horse Shoe Co.'s tunnel has just reached the lode, which looks well, and the men who were at work were in high spirits over the outlook.

MENDOTA.—We learn the output of the Mendota mine of February, was 56 tons 640 lbs, the gross value of which was over \$4,500, and which netted nearly \$3,000. This was produced by Beck & Co., lessees, with the labor of less than four men employed in the mine. The lessees are preparing to add a night shift. Hennessy & Shay, adjoining lessees, are sinking a new shaft, in which they struck 18 inches of solid ore at a depth of 25 ft, which shows abundant gray copper, and the vein is widening as they go down. The shaft is to be sunk 60 ft before drifting is commenced, and it is highly probable they will have good ore all the way down.

Montana.

MONTANA COPPER CO.—*Butte Miner*, March 7: The Montana Copper Co., confines its works in the Colusa strictly to that point, where the copper ore contains an average of about 40 ounces of silver per ton. Sufficient ore is taken out, to supply the blast-furnace, and five matting furnaces. It requires the steady run of 8 calcining furnaces to calcine the ores, two more calcining furnaces are in process of construction and Mr. Raunheim expects to start them up this week. An enormous ore pile is roasting in open heaps, the latter still increasing. We counted 15 heaps and were informed that each contains from 40 to 50 tons of coarse ore. The first class ore from the mine is shipped separately, probably to England, same as the matte.

THE MOULTON.—The *Miner's* reporter took a trip through the Moulton yesterday and found the mine looking well in every level, stope and drift. The southwest and southeast drifts from the 300 west cross-cut are being vigorously driven. The southwest drift has advanced 40 ft on the ledge from the west cross-cut. The ledge is showing up fine and stands out 8 ft wide, all quartz. The southeast drift which was started last week, is in 10 ft. The vein is widening and looking well. An upraise has been started on the 300 north vein, and is in a fine body of ore which carries heavy wire silver. The west drift from the 400 continues in good ore and the old stopes of the 200 are producing their usual output. After a steady run of 65 days the mill has been shut down for general repairs since Friday, and will start up again to day.

Oregon.

NOTES.—*Jacksonville Times*, March 10: Jack Layton, of Applegate, has a large force of men at work cleaning out his ditches. Goldworthy & Justus, of Footh Creek, who have superior water privileges, are able to do considerable pipping. Sargent & Sons, who are mining on Thompson creek, Applegate precinct, have obtained excellent prospects. The weather continues discouraging to miners, who fear that they can make no run of any consequence this season. Bebec & Co. have been making a claim near Waldo, which turned out better than Supt. Hawkett expected. Some of the miners have not done any work at all so far. The present season is the worst for mining ever known in southern Oregon. Frank Ennis and James Hansen, accompanied by Charles Howard, surveyor, went over to Josephine county last week, to look at some mining ground which they will probably purchase. Mr. Ennis returned Tuesday.

"Rusty Gold."

The following paper on "The Cause of Rustiness, and of Some of the Losses in Working Gold" was read before the American Institute of Mining Engineers by T. Egleston, of the School of Mines, New York:

There has always been a theory among those working placer mines, that gold is both found "rusty," and becomes so under treatment, by which they mean, not that gold becomes coated with oxide of gold, but that it is either coated superficially or alloyed with some substance which prevents the contact with mercury, and thus precludes the possibility of amalgamation. To such conditions of the gold are ascribed the losses in working most placer deposits. Rusty gold is often talked about, but is not often shown, and when produced oftener amalgamates than not. It is frequently covered with a brownish coating, and has a much redder color than ordinary gold. The coating is very irregularly distributed over the surface, every spot where the least abrasion has occurred showing the true gold-yellow. All such spots form contact surfaces, and cause the whole piece to amalgamate readily. When the gold is wholly coated it resists the action of the mercury for a considerable time, and, perhaps, altogether. This coating on gold is due to the superficial action of some substance, which is soluble, and is often precipitated at the same time and by the same causes as the gold, for fine particles of gold are sometimes visible with the microscope in the detached coating. This coating has never, to my knowledge, been carefully analyzed. Those who describe it say that it often cracks off from pieces of gold, leaving them bright. Nuggets of some size are said to have been found in South America, in alluvial soil, coated with a silicate of iron containing considerable gold. Very often the film is entirely composed of silica, which is deposited on and beside the gold. This silica is sometimes opaque, and again quite transparent, so that the gold can be seen dissemiuated through it, with the microscope, just as chalcocite crystals are seen in the red chalcodony of the district around Knoxville, Cal. When the silica surrounds the gold entirely it prevents the gold from being attacked by the mercury, just as the fine particles of gold from the veins are carried off in the rock when it has not been rendered sufficiently fine in the crushing. While there are many

Artificial Causes Which Produce the Rustiness

Of gold, this covering of the surface with particles of some foreign substance is probably the only one which occurs in nature. In the separation of gold from its ore there are a number of causes which render it rusty or prevent its amalgamation in the mill. Some of these causes I have recently had occasion to investigate, and are, I believe, now announced for the first time; others have been more or less known for a number of years.

It has been asserted that the presence of certain substances alloyed with the gold would prevent its amalgamation. This I have generally found not to be the case. I have made a number of these alloys, and have found them to amalgamate without difficulty, but chemical combinations frequently do resist the action of the mercury altogether, or when they yield it is attended with the formation of a chemical compound with the mercury, and the consequent loss of the latter.

In order to ascertain the causes which prevent the amalgamation of gold, I undertook to reproduce artificially the conditions which were supposed to prevent it. These I found to be mechanical and chemical. I found that if a piece of soft gold which could be easily bent, and amalgamated readily, was hammered on a perfectly bright anvil, with a bright hammer, giving several rapid blows, until the gold had become hard and had acquired a certain amount of elasticity, it would remain in juxtaposition with mercury for a very long time without being affected by it. This hammering increases the density of the metal and closes the pores, so that I have recently had a piece of gold which was put into this condition by hammering remain nearly two weeks floating on mercury without being attacked. If the gold in this condition is heated and cooled slowly, it again amalgamates rapidly. If, however, it is cooled rapidly by plunging it suddenly into very cold water, the amalgamation takes place very slowly. The same metal, after being repeatedly rapidly cooled and heated, amalgamates more readily than if it has only been treated once.

To ascertain the

Effect of Different Substances on the Gold. A strip of clean gold which readily amalgamated was dipped into a solution of sulphhydrate of ammonia, and also into one of sulphuretted hydrogen. After being withdrawn from these liquids and allowed to dry, mercury would not touch either of the pieces. The effects of grease are well known, and the greatest care is taken in most mills to keep the "quick" bright, either by rubbing or by the addition of chemicals, to such an extent in some cases that the chemicals themselves used in excess are often a cause of the very thing they are intended to prevent. All these causes, the hammering, the effect of sulphuretted waters, and also the effect of grease, occur in every mill, and probably have something to do with the losses in gold which take place there.

The effect of the different elements likely to be found with gold was also investigated. A strip of gold which would amalgamate easily

was exposed to vapors of sulphur, after which it would not amalgamate. When the piece was heated in the flame of a Bunsen burner, the film of sulphide was decomposed, and the gold amalgamated readily. To test the effects of arsenic and antimony upon gold, these metals, in variable proportions, were melted with it, and it was ascertained that considerable quantities of arsenic and antimony were in the alloys. Both these alloys amalgamate very easily. Gold and arsenic and gold and antimony were then precipitated together, and it was found that the precipitates were compounds of antimony and gold and of arsenic and gold; they also amalgamated readily. It has been asserted that .0004 gram of antimony to the ton of auriferous pyrites of Grass Valley, and .001 gram in that of Callao, was sufficient to prevent the amalgamation of the gold. This seems, however, to be not quite exact, if the statement given of the conditions in which the gold is found be correct, for there does not seem to be any reason why an alloy with a much larger amount, as in the artificial compounds, should amalgamate readily, and the natural one containing so much less, refuse to do so.

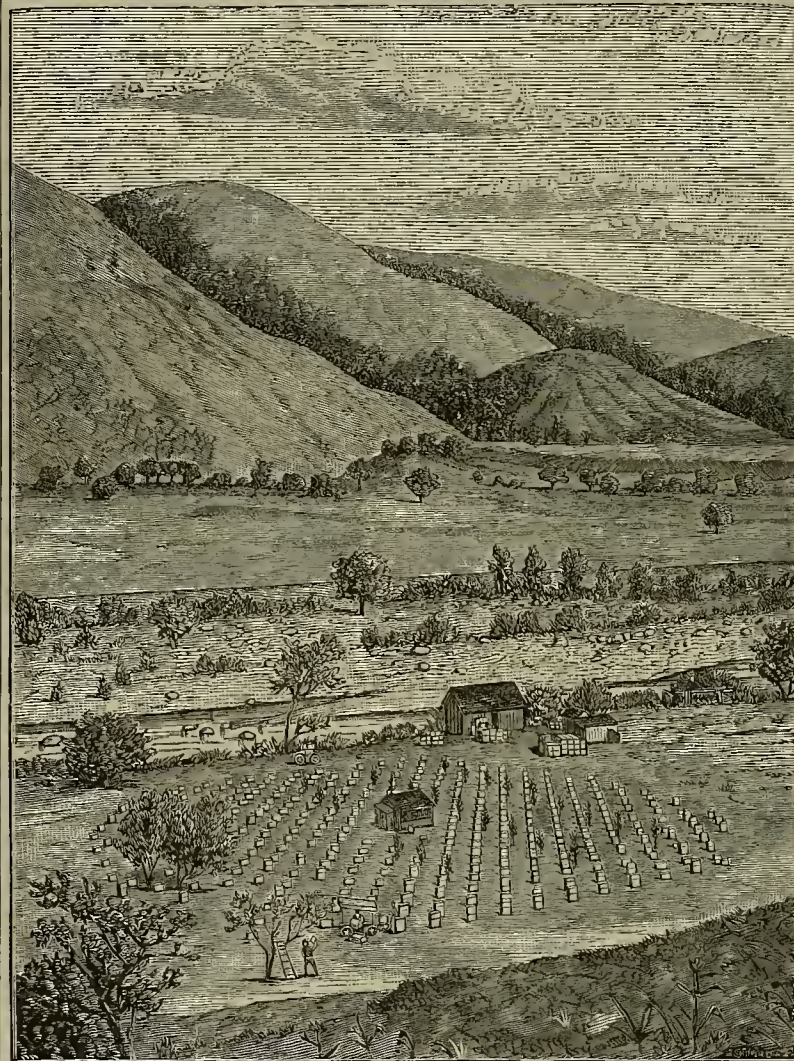
The Effect of Sulphur

Was further studied by making a regular sul-

phur has doubtless the effect to make some of the particles of gold wholly unattainable by mercury, while the action of rubbing that occurs in the arastra is much more likely to pulverize the fine particles of pyrites, to break up any coating that may be around the particles of gold, and to rub off any superficial deposit, and thus bring the gold into contact with the mercury and make it amalgamate. It would be folly to advocate the reintroduction of the arastra, which is so limited in its output, but I am satisfied that we shall have to come back to its principle. It is a very remarkable fact that when, in the early days, Mexicans with the arastra got \$50 to \$60 a day, the stamp mill working on the same rock obtained only \$15 to \$20, and instances are cited where, with the best modern machinery, only \$20 to \$30 can be got out of rock which yields \$700 to \$800 by the fire assay. One or two machines have recently been constructed on the arastra principle, but no systematic tests have been made of them, and little done beyond the singing of their praises by enthusiastic inventors.

The Most Delicate Scales.—What is claimed

to be the most delicate pair of scales in the world,



A BEE RANCH IN VENTURA COUNTY.

phide of gold. When this was heated, it was found that the sulphur was readily driven off by ignition, and the residue, which was bright yellow gold of exactly the same shape as the sulphide, easily amalgamated. A phosphide of gold was then made by pouring melted phosphorus upon hot sponge-gold, and expelling the excess of phosphorus by heating for some time in a non-oxidizing atmosphere. It did not amalgamate. Oxide of gold was made, but this compound is so very unstable, and so readily reduced to metallic gold by simply rubbing, that it could not possibly have any effect on preventing amalgamation, although it is not attacked by mercury. An amalgam of gold was then placed in acid, which easily dissolved out the mercury, and left behind a brown crystalline residue of gold, which readily took up mercury again.

It will thus be seen that

The Stamp Mill

Is not a rationally designed machine. The action of pounding is likely to put some of the gold into such a condition that the mercury will not touch it, and to flour the gold, as well as the quicksilver. There is, besides, in the mill every probability of the introduction of grease or greasy substances, like the powdered hydrated silicates of magnesia and of alumina, which not only froth but coat the gold with a slime which prevents the action of the mercury. If the water used in the mill is not pure, there is a further likelihood of the introduction of sulphuretted hydrogen, and of other soluble sulphides, which act superficially on the small particles of gold, and prevent the action of the mercury. The pounding action of the stamp

according to the account given in the scientific papers, the beam is made of rye straw, and together with the pans, which are made of aluminum, weigh only fifteen grains. In the most delicate scale heretofore made the beam and pans weighed 68 grains—the beam being made of aluminum—and the instrument was capable of weighing to the one-thousandth of a grain. This new scale, however, weighs to the one-tenth-thousandth of a grain. A piece of hair one inch long, on being weighed with this wonderful apparatus, was found to represent the almost infinitesimal quantity of one-thousandth of a grain.

California Bee Ranches.

The engraving shows a bee ranch in Ventura county, and presents many features common to the bee farms of Southern California. They are generally little nooks of land near the mountains, which give acres of natural bloom, from which the bees gather their stores. They are quiet retreats, where solitude is rarely broken, save by the monotone of the busy insects or the ripple of the mountain stream which flows by the apiary. The picture shows the arrangements common to the practice of bee-keeping on these farms, of which there are hundreds in the counties of San Diego, San Bernardino, Los Angeles, Ventura and Santa Barbara. In a good year, when sufficient rain brings a full growth of the natural bee forage plants, the gathering of honey surpasses bee work in any other county where bees are kept, and brings abundance of money to the patient apiarian.

Building Debris Dams.

Another Decision Against the Farmers.

In the Superior Court of Sacramento county, last week, Judge T. B. McFarland rendered his decision in the case of Digory Hobbs vs. the Amador and Sacramento Canal Company et al., on a motion to vacate or modify an injunction previously granted against defendants as a hydraulic mining company from tailing into the tributaries of Cosumnes river. Freeman and Bates appeared in behalf of defendants for the motion; Geo. Cadwalader for plaintiff in resistance. The decision is as follows:

In this case there has been submitted a motion to dissolve or modify the temporary injunction hereinbefore issued.

The main defendant is a corporation. It was organized, as alleged in the complaint, "for the purpose of constructing ditches and carrying water in the same to mines, and disposing of the same, and mining therewith." It also appears from the complaint and affidavits on file that defendant for many years has had a ditch running from the headwaters of the Cosumnes river to a place called Hill Top, in which it had continuously conveyed water to said last named place; that at said Hill Top defendant owns mines which it has for many years continuously worked with said water, and that it has also sold water to others to be used in mining at said place. It does not appear that the defendant has been, or is, engaged in mining, or selling water for mining, at any other place. Hill Top is at the head of Cook's gulch, which empties into the Cosumnes river at Cook's Bar. The injunction restrains defendant from dumping any tailings into Cook's gulch, or into the Cosumnes river, and from selling water to the owner of any mine, the tailings from which would flow into said gulch or river. The injunction was granted without notice.

Counsel for defendant very forcibly argues that under these circumstances the injunction must be totally dissolved, because without notice it suspends the "general and ordinary business of a corporation." Generally a temporary injunction may be granted either before or after notice; but Section 531 of the Code of Civil Procedure provides that: "An injunction to suspend the general and ordinary business of a corporation cannot be granted except by the Court, or a Judge thereof; nor can it be granted without due notice of the application therefor to the proper officers, or managing agent of the corporation, except when the people of the State are a party to the proceedings." Although this provision has always been a part of the statutory law of California, and similar provision has existed in New York for many years, I find no judicial interpretation of it in either State; and my attention has not been called to any case in point elsewhere.

It may be reasonably mooted whether this provision refers to the stopping of the corporation—to the suspension of its corporate functions, the temporary paralyzing of its corporate life, or whether it refers to those acts—to that kind of business—which a natural person may do as well as a corporation; and if to the latter, then what constitutes such a total suspension as would come within the provision? If the question were submitted to me upon an original application for an injunction, I would be less embarrassed in determining it. The conclusion to which I have come is this: While I have doubts as to the power to grant the injunction in this case without notice, I am not so clear about the matter as to feel warranted in declaring it void from the beginning, which would be the result of sustaining defendant on this point. And I have alluded to the question to this extent, so that the Bar may consider it in future cases.

The motion to dissolve or modify this injunction involves, in some measure, though not wholly, the general question of the right of hydraulic miners to continue their business. Upon that general question, with the exception of a case recently decided by this court, there are no authorities in point, and no precedents to follow. As no other country ever presented such a spectacle as the present conflict between the miners and a part of the agricultural interests of California, so have the courts of no other country been called upon to determine such a question as that conflict raises. But while neither the Supreme Court of this State, nor any of the Federal Courts, have had occasion yet to pass upon the question, it has been determined, to some extent at least, by a recent decision of this Court, Judge Temple presiding. I refer to what is generally known as the Gold Run case. That case was elaborately prepared and presented. A great many witnesses—scientific and otherwise—from all parts of the country, were examined. Each side was represented by able counsel. The judge before whom it was tried was eminent in his profession, and of wide experience on both the nisi prius and Supreme bench. I think, therefore, that, in the present unsettled state of the laws, I may safely follow his conclusions, so far as they apply to this case.

From a careful reading of his findings and opinion I take his conclusion to be this: That hydraulic miners have not the right to continue to indiscriminately flow all the tailings from their mines into the streams, to the injury of riparian owners below; but that they may continue to mine provided that, by any means, they can and do retain all the heavy material and allow nothing to escape except the light matter which is held in suspension in the water. The learned Judge says: "I have concluded to so find that

when the heavier debris is completely impounded mining may be resumed, virtually refusing to hold that the plaintiff may enjoin such operations as only corrupt the water with mud and render it less suitable for domestic and other uses. Perhaps I am somewhat moved to this by the consideration that otherwise mining can never be prosecuted at all. It will probably be impracticable to impound the lighter portion of the sediment. I confess I shrink from a consequence so far-reaching."

In some respects the case at bar materially differs from the Gold Run case. In the latter the State was plaintiff and represented, or assumed to represent, all the people, and all the interests injured by mining. It involved questions not only of damage to agricultural lands, but of damage to navigable rivers and the bay of San Francisco. The case at bar is between individuals, and involves only damage to the private land of plaintiff.

Again, the facts of this case differ materially from those of the Gold Run case. The motion was submitted upon affidavits. These were conflicting, contradictory and unsatisfactory. Both parties requested me to visit the premises and make a personal inspection of the mines, the gulch, the dams and all the surroundings. This I did a few days since, and my conclusions of facts are founded on both the affidavits and my personal examination.

The hydraulic miners of the upper Sierras used to piping against banks several hundred feet high, with a corresponding hydraulic pressure, would hardly call these diggings at the Hill Top hydraulic mines at all. They are situated on the lowest part of the foothills, and are composed of small hills or hillocks surrounding the upper part of Cook's gulch. The gravel deposit ranges in height from 12 to 30 or 35 feet. The average height is certainly much less than 30 feet. The vertical hydraulic pressure is from 25 to 30 feet. The water, therefore, comes from the nozzles with very little force to bore into or knock down the banks. The process is more like washing or sluicing than piping. It is aided by occasional blasting with powder; but still the amount of material washed off is necessarily small. The bank is of a reddish color, and is composed of cobbles, smaller gravel stones, clay, and some sand. The tailings from the mine, except the very heaviest, run through a cut and flume and dump into Cook's gulch. About 2,000 feet below the dump there is a brush dam entirely across the gulch. It is about 500 feet long, and, when I saw it a few days since, about nine feet high. It seems to be very firm and strong. It has been raised gradually as the tailings have accumulated above it. When I saw it there was a solid mass of tailings above it to within a foot or two of the top. Some distance above this dam the water spreads out in several channels, which continually change and seem to deposit nearly all the heavy material. This dam is not intended to be water-tight, but to catch the tailings and allow the water to find its way through the upper part of brush. From a point 300 or 400 feet above the dam, up to the dump, the gulch is somewhat steep, but below the dam the grade is very light, and the surface quite flat. At a point 2,270 feet below, defendant has constructed another dam, which is made of timbers and earth, and is water-tight. This dam hacks the water so as to make a pond 300 feet wide, and several hundred feet long. It could easily be made wider and higher. Attached to this dam, by a flood-gate, is a board flume, which carries the waters to a point about 300 feet from the river, where they are again dumped into the gulch. Nothing seems to pass into the river except such light material as is carried in suspension. Heavy matter, in order to get into the river, would have first to pass over at least 1,500 feet of surface before it reached the tailings held back by the brush dam. It would then have to be carried over the level surface of such tailings and through the dam, which is not likely to happen. It would then have to pass over a nearly level surface for about 1,800 feet, and then through a pond of water 400 or 500 feet, and up over the flood-gate of the lower dam. Such an occurrence is scarcely possible, certainly not probable. All this, however, is upon the basis that defendant, either by enlarging the present dams as necessity may require, or by building additional ones, shall keep the gulch up to its present capacity of holding tailings, which will be its duty to do. Between the present dams there is room for erecting several others. The average width of the gulch between these dams is at least 500 feet; and I see no difficulty, with proper care and diligence, in retaining the heavy material for a long time to come—perhaps until the mines shall have been exhausted.

But it is claimed by plaintiff that the dams are liable to break, and suddenly precipitate upon the lands below the accumulated mass of tailings. Of course, any dam may break; although it is evident that a dam filled nearly to the top with solid earth has to bear no such pressure as a dam of similar height filled with water. Whatever might be this danger in large rivers swept in flood times by torrents gathered from drainage areas of hundreds of thousands of acres, I think that the apprehended danger in this case has no reasonable foundation. The drainage area of Cook's gulch is of the most limited character. Its entire length from the Cosumnes river to the uppermost point from which rain water could naturally flow into it is only one mile and a half. From the present brush dam to the upper end of the gulch is only three quarters of a mile. The average width of the level part is from 400 to 500 feet, and the dis-

tance from either side to the top of the hill is very short. I do not think that the average distance from the top of the hill on the other side is greater than three fourths of a mile. It is evident, therefore, that no considerable amount of natural water—certainly no dangerous torrent—is ever likely to flow down said gulch. If the dams should break, the only danger would be from the water flowing from defendant's ditch—the amount being more than 1,000 inches. But in case of danger the defendant could immediately turn the entire water of the ditch off and away from Cook's gulch, and it would be both its duty and interest to do so. Considering these circumstances and the further fact that plaintiff's land is more than 16 miles below the mouth of the gulch, I see no just cause for plaintiff's fear of injury from the breaking of the dams.

If the Courts of last resort shall declare the law to be that the miner has no right to pollute the streams at all, then, of course, defendant will have to be perpetually enjoined from working its mines. But, assuming the present state of the law upon the subject to be as I have stated it, and as it was declared in the Gold Run case, then I think that the injunction should be so modified as to allow defendant to work its mines in accordance with the views and upon the conditions herein set forth. Of course this decision is based upon the particular facts of this case, and is not to be considered a precedent for cases where the facts are materially different.

An order will be prepared and entered modifying the injunction in accordance with these views; and defendant must exercise the greatest diligence in keeping its dam up to its present efficiency, or the modified injunction will be considered as violated.

USEFUL INFORMATION.

Useful Facts in Hydraulics.

Doubling the diameter of a pipe increases the capacity four times.

The ordinary speed to run a pump is 100 feet of piston per minute.

To find the area of a piston, square the diameter and multiply by .7854.

Each nominal horse power of boilers requires one cubic foot of water per hour.

A gallon of water (U. S. standard) weighs eight and one third pounds, and contains 231 cubic inches.

A cubic foot of water weighs 62½ pounds, and contains 1,728 cubic inches, or seven and one half gallons.

Circular apertures are most effective for discharging water, since they have less frictional surface for the same area.

The capacity of pipes is as the square of their diameters; thus, doubling the diameter of a pipe increases its capacity four times.

Hydraulics treats of fluids in motion, and especially of water, the machinery and works for raising and conducting it, its action in canals, races and rivers, its adaptation to water wheels as prime movers, etc.

The height of a column of fresh water, equal to a pressure of one pound per square inch, is 2.31 feet. (In usual computation this is taken at two feet, thus allowing for ordinary friction.)

To find the velocity in feet per minute necessary to discharge a given volume of water in a given time, multiply the number of cubic feet of water by 144, and divide the product by the area of the pipe in inches.

To find the pressure in pounds per square inch of a column of water, multiply the height of the column in feet by .424. (Approximately every foot of elevation is considered equal to one-half pound pressure per square inch.)

To find the diameter of a pump cylinder to move a given quantity of water per minute (100 feet of piston being the speed), divide the number of gallons by four, then extract the square root, and the result will be the diameter in inches.

The time occupied in discharging equal quantities of water under equal heads, through pipes of equal lengths, will be different for varying forms, and proportionally as follows: For a straight line, 90; for a true curve, 100, and for a right angle, 140.

To find the horse power necessary to elevate water to a given height, multiply the total weight of column of water in pounds by the velocity per minute in feet, and divide the product by 33,000 (an allowance of 25 per cent. should be added for friction, etc.).

To find the area of a required pipe, the volume and velocity of water being given, multiply the number of cubic feet of water by 144, and divide the product by the velocity in feet per minute. The area being found, it is easy to get the diameter of pipe necessary.

To find the quantity of water elevated in one minute, running at 100 feet of piston per minute: Square the diameter of water cylinder in inches and multiply by four. Example: The capacity of a five-inch cylinder is desired. The square of the diameter (five inches) is 25, which, multiplied by four, gives 100, which is the number of gallons per minute (approximately.)

The best form of aperture, for giving the greatest flow of water, is a conical aperture, whose greater base is the aperture, the height or length of the action of cone being half the diameter of aperture, and the area of the small opening to the area of the large opening is 10 to 16; there will be no contraction of the vein, and

consequently the greatest attainable discharge will be the result.

Water in falling is actuated by the same law as other falling bodies; passing through one foot in one fourth of a second, four feet in one half second, nine feet in three fourths of a second, and so on; hence its velocity flowing through an aperture in the side of a reservoir, bulkhead or any vessel, is the same as that of a heavy body falling freely from a height equal to the distance between the middle of the aperture or hole to the surface of water below.

WATER A PRESERVATIVE OF TIMBER.—The posts of a railing recently put up in the new office of the Sycamore Powder company, on Market street, Nashville, are carved out of white oak timber cut about 45 years ago, at Sycamore Mills, in Cheatham county, Tenn. The timber out of which these posts were made was used by the late Judge Samuel Watson in the construction of a mill-race, and lay immersed in the water over 42 years, when they were taken out, and after being seasoned, Major Eugene Lewis, Manager of the Powder Company, had them fashioned into their present shape. The wood is as sound as it was the day it was cut, and has become as hard as iron, and turned very dark, almost black color.—*Southern Lumberman.*

TO REMOVE GLASS STOPPERS.—When, says Dr. Squibb, the fixed stopper of a glass bottle resists all management—such as warming the neck with a cloth wet with warm water, by tapping and by the wrench, or by all these in combination—there is another means which will almost always succeed. Let the bottle be inverted, so as to stand on the stopper in a vessel of water so filled that the water reaches up to the shoulder of the bottle, but not to the label. Two or three nights of this treatment may be required sometimes before the stopper will yield.

A SINGULAR OCCURRENCE.—Seven large grindstones burst in the Junction Iron Company's nail mill, recently, at Mingo Junction, Ohio, one at a time. The reports were about one minute apart. Captain James Prentiss, of Steubenville, was seriously hurt, and will die. About 200 men were in the building, and it is remarkable that more were not killed or injured.

GOOD HEALTH.

An Improved Earth Closet

EDITORS PRESS:—In *Rural Press* of Mar. 3d, one of its correspondents gives some advice concerning an earth closet, and how to construct one on an inexpensive plan. We have had one in use which has proved eminently satisfactory for ten years, or more, and can heartily recommend the earth closet plan to all as a vast improvement over those pest-breeding abominations, the usual privy vault, whether deep or shallow (for there is little difference between them in a hygienic point of view), wherein the seeds of disease lie in wait, like assassins in the dark, ready to seize upon the unwary at any moment, when, from weakness, over-exertion, or a receptive condition of the system from any other cause, they may find an unsuspected and unguarded victim whereon to fasten their fatal fangs.

Our earth closet, though as simple in its construction as that recommended by your correspondent, has some improvements over the one there described, which, we think, add greatly to its convenience, as they contribute materially to the ease and rapidity with which its contents can be disposed of whenever that operation becomes necessary. It consists of a plain wooden box, made of inch and a half lumber, one foot deep, six feet long, and eighteen inches wide, which is fitted under the ordinary outhouse; but, instead of being set flat upon the ground, the box is arranged upon short 2x4 runners, like a sled, with a heavy staple (or a hole bored by a large auger will answer just as well) in the end of each runner. Into these, a rope or hook can be fastened, by which the box can be hauled out without any trouble to the manure pile, where, by the aid of two strong handles attached to each upright end of the box, the contents can be dumped at once in any desired spot, without the necessity of further handling, and the box washed out with the hose, sprinkled with lime, or a solution of copperas water, as a deodorizer and disinfectant, and restored to its position under the outhouse in as healthful and unobnoxious a condition as it was when it was first placed there.

Wherever it is practicable, it adds greatly to the convenience of this matter if the outhouse itself forms a portion of the barn-yard fence, with the back toward that yard. A broad plank hung by strong hinges forms a hanging door, which hides the movable box from sight, except when it is to be emptied, when the trap-door is easily fastened up and out of the way until that operation is completed, when it falls into place again.

During the summer months, when road dust, as a dry, fine powder, can be obtained in any quantity, it should be gathered up and stored away in barrels in some out of the way place where it will be protected from the weather. From there it can be transferred as it is required to a vessel kept in the earth closet for that purpose, and used to sprinkle over the contents of the box whenever necessary. This will

completely destroy any disagreeable odors arising therefrom, and in a marvelously short time convert the whole mass into clean earth.

It is a good plan to have the emptying of the box as a signal for turning over the manure pile, dumping its contents in the desired place, and heaping upon them the fresh litter from the barn and sheds, then transferring upon this pile that under which the last deposit from the box had been buried. In this way the whole heap is thoroughly worked over every little while, and the night soil (which the previous admixture of clean earth had disinfected of all its dangerous disease-breeding elements) becomes a power for good instead of evil, since its presence, when thoroughly incorporated with other manures, greatly enhances the value of the whole mass.

Realizing how important to the health of whole communities is the question of the proper disposition of deposits of this nature, we have been more explicit than was, perhaps, necessary in our description of this cheap earth closet, with the hope that others may be induced to adopt this plan, and thereby render innocuous a source of disease and danger as universal as it is unsuspected.

HARRY LYNWOOD.

BREATHE THROUGH THE NOSE.—Dr. Ward, Physician to the Metropolitan Throat Hospital New York, in an article on singers' throat troubles, in the *Musical Critic*, treats of the various kinds of catarrhal troubles experienced by public singers, and repeats the well known fact that the nose is the only channel through which air should pass during ordinary act of breathing, the mouth being intended only as an accessory breathing agent when, on certain occasions—as, for instance, running—the lungs demand a rapid supply of air. The air, in passing through the nostrils, is warmed and sifted of its harmful ingredients, and thus prepared for its reception into the delicate structures below. If it passes directly into the mouth without the above preparation, it will frequently cause irritation and inflammation of the mucous membrane lining the mouth and throat by being, in the first place, too cold, and in the second place, by containing irritating particles of dust and other matter.

SERIOUS HURTS THAT FAIL TO KILL.—A short time ago a shoemaker of Astoria, N. Y. shot himself twice with a heavy pistol, once in the ear and once in the month. He was brought to the Roosevelt Hospital, in this city, where it was discovered that the first ball glanced from the skull. The other is thought to be somewhere in the head, perhaps in the brain. Speedy death was expected; but the next day the patient walked away from the hospital, saying that he was sorry for the attempt on his life, but appeared to be in no immediate danger of dying.

With this case as a text, a writer in a morning paper reviews a large number of more or less marvelous cases of recovery from grievous hurts, showing that serious injuries to the main organs of the body are not always followed by death. Men persist in living, not only with bullets in their brain, holes in their stomach, dislocated vertebrae, and wounds in the heart, but even with open wounds clear through the body. During the civil war, General H. A. Barham, of Brooklyn, received in battle a wound which still remains an open passage through the body. For years the treatment of this wound has been simply to wear in it a roll of prepared lint, which is renewed daily. The suppuration of the wound is constant though variable.

General Shields, of Missouri, had a similar wound extending through his body, and open in front and behind. His wound, it is said, was received in the Mexican war, and he wore, not lint, but a silk handkerchief in it. This he could draw directly through his body.—*Sci American.*

THE DIGESTIBILITY OF OYSTERS.—Why oysters should be eaten raw is explained by Dr. William Roberts in his lecture on "Digestion." He says that the general practice of eating the oyster raw is evidence that the popular judgment upon matters of diet is usually trustworthy. The fawn-colored mass, which is the delicious portion of the fish, is its liver, and is simply a mass of glycogen. Associated with the glycogen, but withheld from actual contact with it during life, is its appropriate digestive ferment—the hepatic diastase. The mere crushing of the oyster between the teeth brings these two bodies together, and the glycogen is at once digested without any other help than the diastase. The raw, or merely warmed oyster, is self-digestive. But the advantage of this provision is wholly lost by cooking, for the heat immediately destroys the associated ferment, and a cooked oyster has to be digested, like any other food, by the eater's own digestive powers. "My dear sir, do you want to ruin your digestion?" asked Prof. Houghton, of Trinity College, one day of a friend who had ordered brandy and water with his oysters in a Dublin restaurant. Then he sent for a glass of brandy and a glass of Guinness's XX, and put an oyster in each. In a very short time there lay in the bottom of the glass of brandy a tough, leathery substance resembling the finger of a kid glove, while in the porter there was hardly a trace of the oyster to be found.

MINERS and stage drivers are arriving in Salt Lake daily from Idaho with frozen hands and feet, caused by the severe weather of a few weeks ago. They are taken to the hospital, where amputation is found necessary in almost every instance.

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TABLE OF CONTENTS.

EDITORIALS.—Gold Discoveries in British Columbia; Gold; Improved Vertical Engine and Boiler; Early History of the Comstock Mines, 177. Passing Events; British Columbia as a field for the Prospector; Fisheries and Lumber Interests of British Columbia, 184. Mining Regions of British Columbia, 190-91. Tramps, 191. Patents and Inventions; Notices of Recent Patents, 196.

ILLUSTRATIONS.—Riv's Improved Vertical Engine, 177. Off on a Prospecting Trip, 184. Plans of Patio Process, 185-86. Map of British Columbia and Alaska, 188-89. **CORRESPONDENCE.**—A Gold-Producing Region, 178.

MECHANICAL PROGRESS.—Invention Helps Labor; A Cotton-Picking Machine; Is Paper to be the Rail of the Future?; Torsion Tests of Cast Steel; A Continuous Steam Engine Recorder; Molecular Structure of Metals; The New Nail Making, 179.

SCIENTIFIC PROGRESS.—Ancient Mode of Baking Walls; Analyzing Blast Furnace Gases; The Latest Electrical Discovery; Photograph of the Late Comet's Tail and Stars; Electricity in Mills; An Observatory for Oakland; Ancient Manuscripts; Reasoning Animals, 179.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends and Bullion Shipments, 183.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana and Oregon, 180-81.

USEFUL INFORMATION.—Useful Facts in Hydraulics; Water a Preservative of Timber; To Remove Glass Stoppers; A Singular Occurrence, 183.

GOOD HEALTH.—An Improved Earth Closet; Breathe Through the Nose; Serious Hurts that Fail to Kill; The Digestibility of Oysters, 183.

MISCELLANEOUS.—The Postal Telegraph; A State Bureau of Labor Statistics; Descending Shafts; Seasoning Wood, 178. "Rusty Gold," California Bee Ranches, 182. Building Debris Dams, 182-83. The Patio Process, 185-86-87-92. British Columbia and its Mines, 188-89-90. Recent Contributions to the California State Mining Bureau, 191. The Coming Eclipse of the Sun; Home Manufactures, 193.

NEWS IN BRIEF.—On page 196 and other pages.

BUSINESS ANNOUNCEMENTS.

Dissolution Notice—South Comstock Gold & Silver M. Co. Dividend Notice—Northern Belle M. & M. Co. Powder—John Skinner, S. F. Water Tanks—Wells, Russell & Co., S. F.

Passing Events.

We publish this week a double edition of the MINING AND SCIENTIFIC PRESS, devoted to the description of the British Columbia mining regions. The large map we give will also be found useful for reference.

With the warmer weather, we hear of prospectors getting ready to start out in all directions, and within a few weeks many hundreds of them will be at work. Southeastern Nevada, a region which we recently described pretty fully, seems to be attracting a good many prospectors and miners about this time. The railroad facilities afforded will help the region out greatly.

The miners generally seem to have made up their minds to a dry season. In some directions, however, this is beneficial. River mining, for instance, has been prosecuted this year more favorably than ever before. This branch of business is however mainly carried on by Chinese, though some white men are at work. Along the river the unusually low stage of water has stimulated them to greater activity than ever before, this making it possible for them to work ground that would be inaccessible in ordinary seasons.

Our State Legislature has finished its labors and adjourned sine die.

Bodies of good ore are being developed in the Rescue, Stafford, and Original Hidden Treasure mines, at Hamilton, Nev., which are the property of the Sweetwater Co. The Elberhardt tunnel is also said to be looking well.

British Columbia as a Field for the Prospector.

As compared with California and most other sections of the Pacific coast, the prospector will find British Columbia a hard country in which to prosecute his laborious calling. In the first place, he has to penetrate the heavy timber belt, which reaches inland a hundred miles or more from the coast. If he proceeds, however, by way of the Fraser river, this is accomplished readily by taking the steamer at Victoria, which conveys him up that stream to Fort Yale or Hope, according to the stage of water. This carries him nearly through the heavy timber belt and to the edge of a more open country, which, as he proceeds further north or east, rises into a sort of elevated plateau sparsely timbered with pines and other coniferous trees, intermixed in some places with a rather stunted species of oak.

The forests nearer the coast, which consist mainly of spruce, fir and hemlock, stand tall and thick, forming a damp and gloomy stretch of woods without prairie lands or other openings, except occasionally a little glade at the confluence of the larger streams or a fern-clad hill, which seen afar off has much the appearance of a green meadow or a field of ripening grain. But it is all an illusion, these patches of "brake" serving no useful purpose except as a covert for rabbits and other small game. Though always green no animal ever feeds on this fern, nor do

hours continuance, there being no protracted storms. Even in the winter the snowfall here, except on the mountains, is not great, cattle subsisting in the valleys without housing or fodder. The streams abound with salmon and other fine fish and there is considerable game in this section of country. The miner can also obtain fresh beef and other supplies till he gets as far north as Caribeean and as far east as Hamloops and perhaps a little further. Beyond these points he will have to depend on fish, game and such provisions as he takes with him.

The most inviting portion of British Columbia to the prospector would seem to be over on Peace river and the region adjacent, gold in paying quantities having been found at various points along that stream. For several years past, small companies of Chinamen are reported to have been at work there. That they have made at least moderately good wages may be inferred from the fact of their remaining so long. Some parties of white miners operating on Cherry creek, and on several other streams in the Kootenay country, are also said to be doing tolerably well, and as there is now steamboat and railroad transportation well on towards that section of the Province, prospectors bound for the north might perhaps find there a good field for prosecuting their calling.

Fisheries and Lumber Interests of British Columbia.

The Fisheries.

In addition to the descriptive article accompanying the map, we are indebted to Mr. W. D. Patterson for the following notes: The salmon on the Fraser river are of two varieties.



OFF ON A PROSPECTING TRIP.

any except these mentioned ever frequent it. Not a blade of grass, or even a weed or flower is ever seen amongst it, its presence like a deadly Upas appearing to extinguish every other form of vegetable life. Although a great deal of the country occupied by these forests is but little elevated above sea level, much of it consists of scraggy hills and rugged mountains, portions of the latter being but scantily timbered. It is uninhabited, except a few white settlements along the Fraser, and the aboriginal tribes, who gather in lodges near the coast and along the principal streams. As it affords but little grass or other sustenance for animals, this region contains scarcely any deer, or other large game. It abounds, however, with herries, on which some bears manage to live, and which, in connection with salmon, form the principal food of the Indians. No gold or silver mines of importance have been found in this heavily timbered section of the country. It behooves the prospector, therefore, to get through it as speedily as possible into the more pleasant and open regions beyond.

But even here the seeker after gold will have such difficulties to encounter and such hardships to undergo as will try his courage and powers of endurance severely. Owing to the rigors of the winters no mines can be worked nor prospecting done during that season of the year, the first of April being as early as the miner can safely take the field, which can be kept never later than the end of November. Never more than eight, usually not more than seven months of effective work can be counted upon in the course of the year. The climate in the interior of British Columbia from April to November may be considered a pleasant one, the summer months being warm with cool nights, as in California. Rain occurs during this period in showers usually of only a few

The sockeye, or early spring salmon, seldom weigh more than 10 pounds, and are generally much smaller, but they are a very fine fish, being of a blood-red color when opened, and very fat. This species run up the Fraser in the month of May, and the numerous canneries are then fully employed in netting and securing them. This run continues for about six weeks. The fall run of salmon commences in September, and the fish are of a different variety. They are called Cohoes, are very large and fat, and average from 15 to 20 pounds; some have been caught 50 pounds in weight, in 1881. The quantity of fish entering the river was so great that only the best parts of the fish were put up, and in many instances tons of fish were thrown away. This practice has now been put a stop to, and the canneries are only allowed to catch as many as they can put up.

Previous to the run of salmon in the spring, a small fish called the oilchian swarms in the river. They are of the size of sardines, of a rich and delicate flavor; and, when the fish is dried, so great is the quantity of oil contained in them, that, by lighting one end, they will burn like a candle. The Indians use them as such. The oil extracted from them has been shipped to London in large quantities, and has been found to be superior to cod liver oil for medicinal purposes. Sturgeon are also caught, of large size and good quality, and other salt water fish, as halibut and cod, are numerous. The many other rivers along the coast are well stocked with fish, among which may be mentioned the stickle, naas, skeena, dean, hellacoola, homatheo, mimkish, and numerous others of smaller size; in fact, at the head of all the great inlets, some of which run inland from 60 to 80 miles in length, large rivers enter the sea. These inlets are of great depth, showing 100 to 200 fathoms, although they do not average over half a mile wide. They have been formed, no doubt, by the convulsions of nature during the tertiary era. Ships which have gone up some of these inlets have always made fast to shore. Some canneries are in operation on the Skeena and Naas rivers.

The Lumber Interests.

The saw mills in operation in British Columbia are mostly situated at Burrards inlet. Two

large companies, named the Moodie Saw Mill Co., and the Hastings Saw Mill Co., manufacture millions of feet of lumber for shipment to Australia and South America, and some other small mills are in operation. The logging camps have mostly cut the timber, for the mills along the salt water, called *Pinus Douglasii*. Large quantities of this timber cover the mountain sides, but of course the expenses of supplying the mills with logs will increase when logging roads have to be made to get the timber out to the sea board. The timber at a little distance back from the coast is the best. The cedar found along the river bottoms back from the shore line is very good, it is mostly red cedar and excellent for shingles and fencing. As we travel north the pine disappears and is replaced by the white spruce and white cedar. Above the parallel of 52° north latitude the pine almost completely disappears and the spruce is abundant. This is a very large tree and in good situation straight and without knots, makes tough, light lumber and works well for house use under the plane. Above the parallel of 53° the white cedar abounds. This is a splendid wood, tough and close in the grain and works well under the plane. It is said that the *Teredo Navalis* will not bore in it. It is therefore a most useful timber for wharf piles. For ship building it has been decided by ship builders to be an excellent wood and in lasting qualities it equals the best oak. The beautiful arbutus tree grows on the south end of Vancouver's island and on the islands on the Gulf of Georgia. Hemlock everywhere abounds, some of large size; this is a coarse timber and makes rough lumber, but its bark is the best known in British Columbia for tanning purposes.

The Soil

Of British Columbia where cultivated has turned out good crops. The mean amount of rainfall, averaging 50 inches, annually causes the land on the coast to be more suitable for hay and root crops. In the interior lands of the region, on which the mean annual rainfall amounts to 25 inches, the soil is more alkaline in character, and therefore better suited for wheat crops. The rolling hills of the interior, covered with bunch grass, furnish excellent pasturage for thousands of head of horned cattle and sheep.

The Winters

Are not very long. The cold sets in about the 1st of December, and spring opens out about the 20th of March. The average depth of snow amount to about nine inches on the level. The coldest spell of the season is from the 25th of January until the end of February. In the north part of British Columbia the snow lies deeper and cattle do not thrive so well.

Regarding the mining interests, remark that the principal auriferous deposits have been found in the streams running from the Rocky mountains and spurs therefrom. Streams heading in the Cascade or Coast range have never proved very auriferous. Rich lodes of minerals have been found along the west flank of the Rocky mountains and there is no doubt when the country is properly prospected, it will prove to be a rich mineral country. The volcanic overflow of the tertiary period may have been the cause of the capping of the lodes in the subadjacent formations through the central portion of B. C. and on the coast, so that the river deposits are not rich in gold dust and other minerals. As we travel towards the Rocky mountains, the effects of volcanic overflows seem gradually to be less apparent and the metamorphic formations crop out. This is no doubt the reason of the streams being more auriferous.

The railroad will be completed in a few years from Port Moody on the coast to the Rocky mountains, so that mining machinery can be easily got into the interior and bullion shipped out, and I feel no doubt a large mining field will then be discovered along the west flanks of the Rocky mountains.

The Owyhee mines, according to the *Avalanche*, produced from 1865 to 1875 as follows: Oro Fino, \$2,756,000; Morning Star, \$1,200,000; Poorman, \$4,000,000; Golden Chariot, \$3,000,000; Ida Elmore, \$2,000,000; Red Jacket, \$3,000,000; Silver Cord, \$500,000; Owyhee, \$150,000; Mahogany, \$1,200,000; War Eagle, \$900,000; Empire State, \$160,000; Belle Peck, \$200,000; Trook & Jennings, \$150,000; Silver Legion, \$100,000. Add to this \$540,000 for other mines. This makes \$17,756,000 produced in Owyhee county from 1865 to 1883.

GETTING THAWED OUT.—From all parts of the country south and west of this point comes the encouraging news that the miners and prospectors are getting ready for the season's work. The country is becoming more populous, and claims which were abandoned are receiving a close scrutinizing. The companies which were nearly dead are waking up with the warmer weather, and everything points to the near development of just as good mines as were found in bygone days.—*Candelaria True Fissure*.

A ROPE of refined cast-steel has just been sent by the Roebellings from their mills in Trenton to San Francisco. It is 50,440 feet long, and its diameter is one inch and a quarter, and it weighs 51,000 pounds. It was put in two box cars, each open at one end, half the rope in one car and half in the other, in continuous coil. The rope is for a cable road.

The Patio Process.

The Method as Practiced in San Dimas.

The following paper by Richard E. Chism, San Dimas, Durango, Mexico, was read at the Colorado meeting of the American Institute of Mining Engineers:

San Dimas, in the State of Durango, Mexico, on the frontier of the State of Sinaloa, is the center of an extensive and rich mining region, which has been exploited for over a hundred years, and the patio process for working silver ores has there attained the highest perfection of which it is capable. Local modifications have been engrafted upon the underlying principles of the process, but, as a whole, the San Dimas practice so fully illustrates its typical capabilities, that I have undertaken to describe its workings in the hope of lightening, in some degree, the labors of my professional brethren who may have occasion to visit Mexico.

As is tolerably well known, the patio process,

called *caliche*, and feldspathic ores are called *metal calichoso*. An ore with much gangue is called *despoblado*. *Quimazon* is a black, porous kind of decomposed ore that looks like cinders. The first and second-class ores of the size above indicated are called *metal gabbaro*; smalls, or fine ore, are called *metal granza*.

3. Third class (*metal granza de linaque*, or *tierras de linaque*.) This class comprises the smalls from the cleaners, and is of variable value, according to that of the first and second class ores.

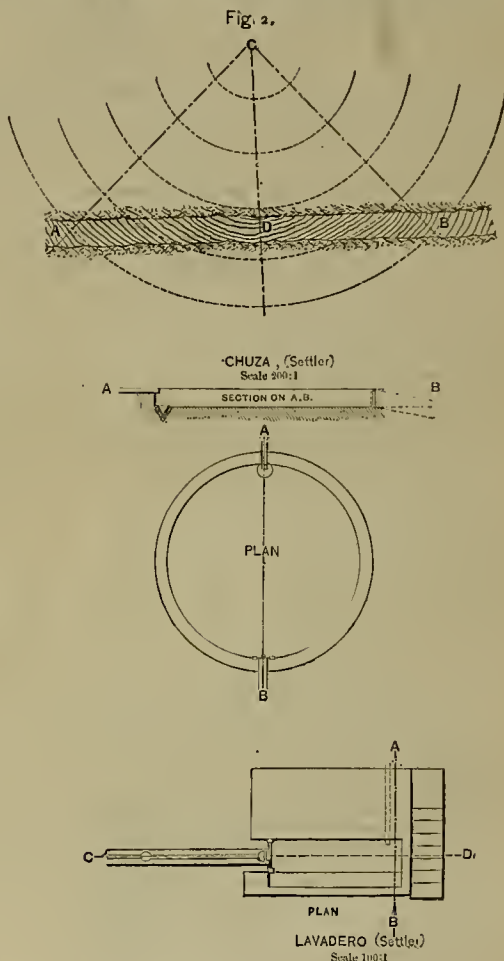
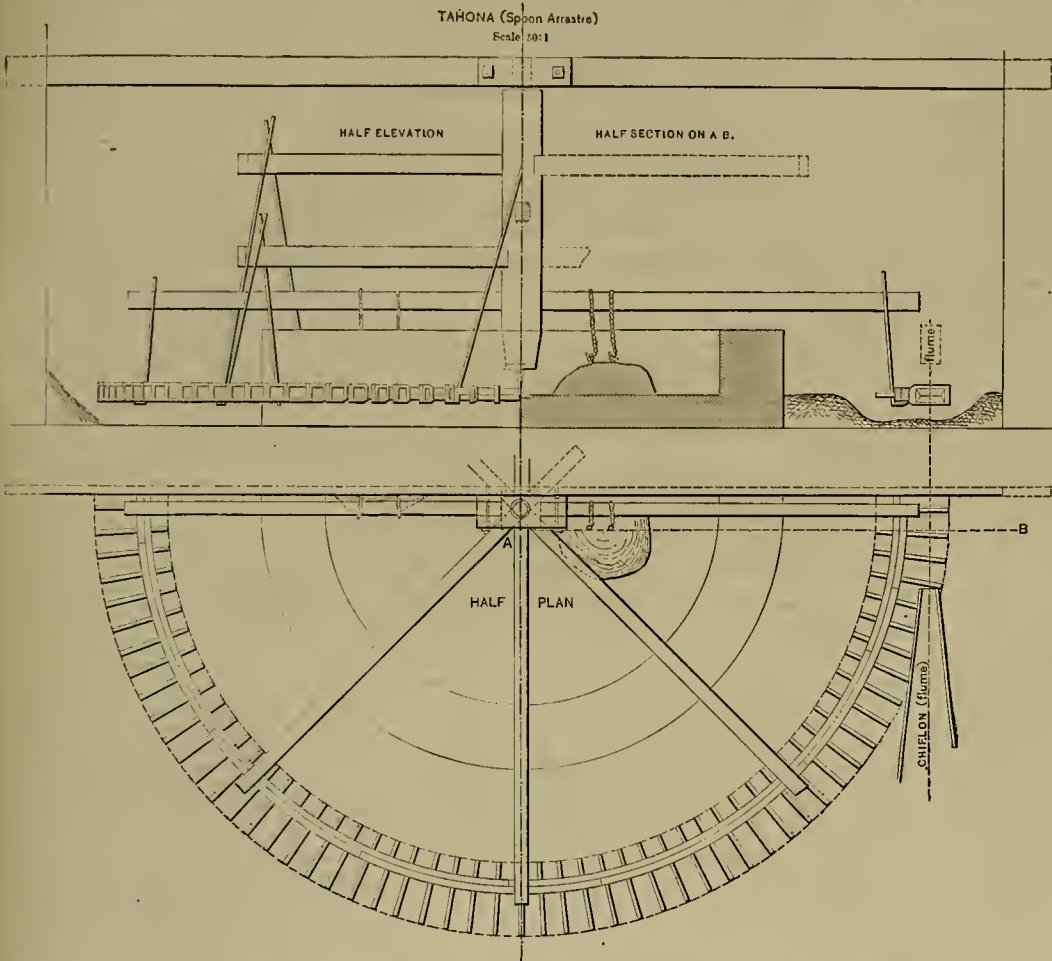
4. Fourth class (*metal granza de labores*, or *tierras de labores*.) This comprises the smalls from the workings in the mine. Being generally mixed with considerable dirt it is inferior in value to any of the other classes.

On arriving at the hacienda, the large ore, *gabbaro*, is broken up to the average size of large peas, though some pieces may be as large as hazelnuts. This breaking is done either by hand (at a cost of \$2.66 a ton), or, in some haciendas, by rude stamps with wooden stems and iron shoes, the total weight of each stamp being about 300 pounds. These stamps are usually set in batteries of four or five, and are moved by a water wheel. At the hacienda of

the same time; an old one and a new one are always working together. From one half to two thirds of the charge is put into the *tahona* at starting, together with a few ounces of quicksilver to catch the fine gold, and just water enough fairly to wet the charge. As the grinding proceeds, the rest of the charge and more water are added, until, when the grinding is ended, the contents of the *tahona* are in the form of a liquid sand.

The *tahona* is made to revolve very slowly at first, but when the charge is well reduced in size, its velocity is increased, the rule being to run fast enough to keep the heavier parts of the charge from settling down and clogging the stones, and not so fast as to make the mud splash out centrifugally. The proper speed is usually from 9 to 10 turns a minute. When the bottom stones of the *tahona* are newly laid (*rehajado*), it is necessary before grinding good ore to grind up a few *cargas* (a Mexican *carga* is 300 pounds), of the lowest class of ore (*tierras de labores*), in order to fill up the cracks between the stones and prevent the escape of gold amalgam derived from the richer ores. The progress of the grinding is tested from time to time by taking an assay (*tentadura*) on a small

bottom, and there accumulates in the cracks and cavities of the stones. When the slimes (*lana*) are fine enough they are watered freely to facilitate the sinking of the rest of the gold amalgam; they are then dipped out into barrels, with the exception of about a barrelful, which is left behind to retain the amalgam, and are thrown into stone slime pits (*lameros*), where they are left to dry partially, by evaporation and percolation, before being put on the patio. When enough slimes have accumulated, they are carried to the patio in barrels, and a *trilla*, called in some parts of Mexico a *torta*, is formed. The *trilla* varies in size according to the richness of the ore and the size and resources of the hacienda, but it seldom contains less than about 10 tons, of 2,000 pounds each (60 Mexican *cargas*), or more than 25 tons. In very small haciendas, *trillas* of from one half to two tons are worked, but there the treading out is done by men and not by mules. Around the slimes, which are brought to the patio in a semi-liquid state, a dam of sand and boards is built up to confine them within limits; they are then left for several days, exposed to sun and wind, until the water evaporates and they acquire about the consistency of brickmaker's clay,



like all other systems of free amalgamation, is not successful with ores containing more than a trace of zinc or lead, the presence of zincblende being especially obnoxious. Iron and copper in small quantities are not particularly disadvantageous. The process succeeds very well with all sulphide ores which do not contain much more than a trace of arsenic and antimony, provided the tailings are concentrated, although, of course it is best adapted for free milling ores. For suitable silver ores that contain small amounts of free gold the process is still a good one, but where the gold is combined with sulphurets, a considerable and even an excessive loss is inevitable. Hitherto the Mexicans have submitted to this loss, but, since the introduction of American mills, they are gradually abandoning the patio process in favor of the other.

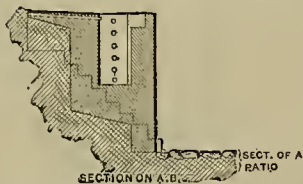
The San Dimas ores have a gangue of quartz and feldspar. They are composed principally of silver sulphides, with some chloride and some native silver, and they carry considerable gold. The impurities are copper pyrites, copper and iron pyrites, and, frequently, traces of zinc, antimony, and arsenic. The ores are cobbled and hand-picked at the mines, and come down to the *hacienda* sorted into four classes, in pieces whose sizes vary from that of an egg to that of an orange. The four classes into which

which I had charge, a Blake crusher has lately been introduced to do this work. The crusher is to be run by a belt from a spoon arrastra (*tahona*), and it is expected that the cost of crushing will be reduced to 30 cents a ton. The cost of crushing by stamps is at least 75 cents a ton. It is also expected that the product of the crusher will be much finer than can be readily obtained by hand or by Mexican stamps. This will leave less grinding to be done afterwards, and thus will increase the product of the hacienda.

The crushed ore is charged into the *tahona*.

An Arrastra Run by Water-Power.

Acting on a ring set with wooden spoons, which is, in fact, a horizontal water-wheel. The largest *tahonas* in San Dimas have the central cup (*tosa*), where the grinding goes on, 3m. in diameter and 0.5m. deep. The diameter of the spoon ring is 6m., and that of the circle touch-

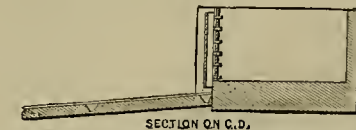


ing the exterior extremity of the spoons is 6.64m. These *tahonas* are intended to hold 1,500 pounds of crushed ore, which they grind down to slimes in about three days. According to calculation the water used should develop, at ordinary times, about four horse-power, of which it is quite probable that not more than one quarter is utilized. The grinding-stones, when new weigh from 1,200 to 1,500 pounds; when worn down to about 400 pounds they are removed. Two new stones are never put in at

red earthen plate (*platillo*) from a point halfway to the bottom of the cup. When no grit can be perceived between the fingers, the grinding is regarded as complete. Horry-handed Mexicans, conscious of a want of sensibility in their fingers, try for grit by rubbing the assay on the lobe of the ear.

The Average Time of Grinding a Charge.

Which I alluded to above as three days, is generally shortened a little if the man in charge of the grinding (*tahonero*) is paid by the number of *cargas* ground, and not by the week. A good *tahonero* gets ten dollars a week, or, if paid by the *carga*, from 15 to 20 cents a *carga*. He has to be on hand night and day, sleeping close by his *tahonas*, and making his rounds several times in the night to see if all is well. It is hardly necessary to say that strict honesty is a most essential requisite in a *tahonero*, for his opportunities for stealing quicksilver, gold amalgam, and ore, are unlimited. In *tahonas* moved by spoons, the grinding, including salary



and repairs, costs \$1.40 a ton. In some haciendas the *tahonas* are placed in groups, and are driven by an overshot water-wheel, the power being transmitted by rude wooden gearing. Although these *tahonas* are smaller, they grind more rapidly, and the cost of attendance is less, so that the cost of grinding is probably not more than \$1 a ton. During the operation of grinding, the

Free Gold in the Ores

Is caught by the quicksilver, and the greater part of the gold amalgam formed sinks to the

which is the proper state for the beginning of work.

Leaving the slimes on the patio for the present, let us return to those remaining in the *tahona* and

Containing the Gold Amalgam.

After a variable number of charges have been ground, and from four to eight pounds of quicksilver have been taken up, a few ounces at a time in each *tahona*, the process of grinding is stopped, and the whole interior of the *tahona* is scraped out with the most scrupulous care. The whole amount of material thus collected is washed in a pit, known as a *chuza*, and the gold amalgam is carefully collected. The *chuza* is about 3 m. in diameter, and 0.5 m. deep. It contains at one side a conical wooden bowl, 0.35 m. in diameter and 0.3 m. deep, whose edges rise about 0.05 m. above the cemented bottom of the large pit. A wooden trough conducts water to the pit, and opens into it directly over the bowl. The material to be washed is put into the trough, in which it is carried gradually along until it falls into the bowl. A man or boy sits over the bowl and keeps the material in agitation by stirring it continually with his foot. In this way the slimes to be washed are thoroughly disintegrated, the quicksilver and the amalgam fall to the bottom of the bowl, the heavier tailings collect in the pit, and the lighter ones are carried away by the water to a settling-tank, or run to waste. The tailings saved in the pit are concentrated by hand, and usually yield some very rich sulphurets, containing large quantities of both silver and gold (*cabezele*). The gold amalgam is wrapped in a cloth, placed inside of a quicksilver flask with the bottom out, or in a small earthen pot, if too small for the flask, and retorted in the usual Mexican manner, of which a description is attempted further on. The resulting spongy mass of bullion is called *oroche*. The quicksilver used in collecting gold in the *tahona* is kept

apart from that used for silver on the patio, as is very rich in the precious metals, and will catch the free gold more quickly than fresh quicksilver.

The Slimes left on the Patio

To allow the surplus of water to evaporate should be found to have, after an exposure of two or three days, according to the weather and the season of the year, about the consi-

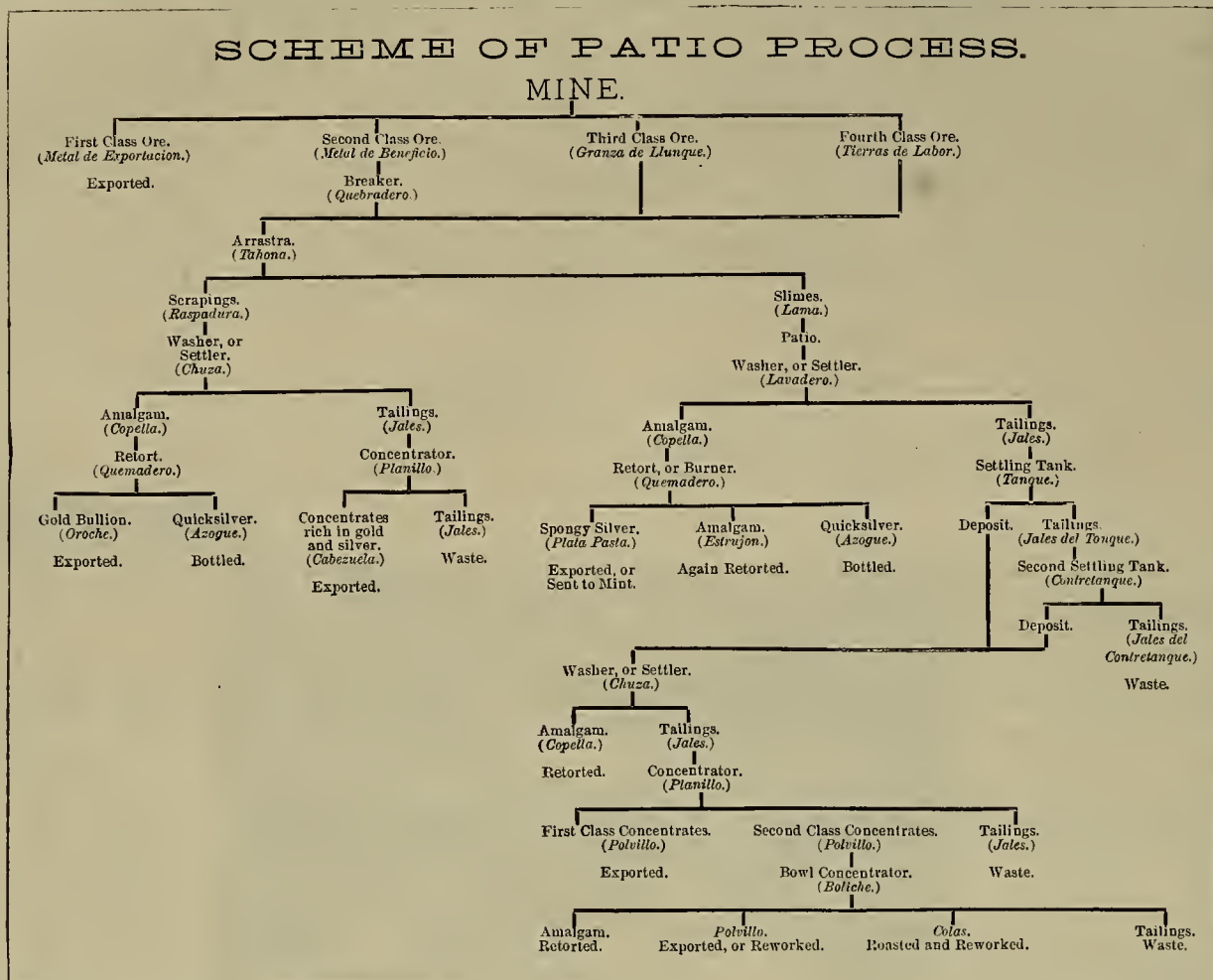
amount to be added varies according to the nature of the ore. Ores with no sulphurets need very little sulphate; those with sulphurets and with traces of antimony, arsenic, or zinc, need the most, and only the experience of the amalgamator can tell him how much to add in each case. For sulphureted ores with only a trace of antimony and arsenic, and no zinc, it is customary to use about eight pounds for each ton of ore. In place of a part of the sulphate of copper

copper is thought to hasten the beneficiating and to lessen the loss of quicksilver. Magistral is not used in San Dimas.

After the Sulphate is Added,

The mules are driven around in the trilla until three o'clock in the afternoon, at which time the silver-bearing mud is carefully washed off their sides and hoofs, and they are led away to pasture. The day's work for the mules is from 6 A. M. to 3 P. M., and it is very fatiguing and

The next day after incorporate, another treading (*repaso*) of the trilla follows. Then there is a day's rest and exposure to the sun, whose effects are stimulated by one or more spadings. If the mass gets too stiff from evaporation, water is dashed over it to keep it sufficiently moist for easy working. The application of water should always be made in the early morning, so as not to cool off the trilla and retard chemical action, as it would do if added at mid-



tency of brickclay. The first thing done with them is to turn them over with a spade, and trim up the mass until it assumes the appearance of a gigantic "dirt-pie," 7 to 15 m. in diameter and from 0.2 to 0.3 m. in thickness.

Twenty-four hours after the first spading, the trilla is salted (*insalmoro*). The quantity of salt used varies according to the character of the ore; but, for sulphureted ores that average \$60 a ton, the quantity used should be from 35 to 40 liters a ton. Mules are then turned in and made to tread the mass for some hours, until, with the help of several spadings, done while the mules are resting, the salt is thoroughly distributed through every part. The number of mules need not be so great as when the full charge of quicksilver and chemicals is in. The trilla stands in this condition over night; the mules then tread it for an hour or two to loosen it up; it is spaded over again, and the charge of quicksilver and sulphate of copper is added. This stage of process is called *incorporo*. The amount of quicksilver added at the incorporate varies according to the nature of the ores and the special practice of the amalgamator (*azoguero*). The total amount required can be closely calculated from a fire-assay of the trilla. The yield of silver on the patio is usually calculated at 65 per cent. of the total amount contained in the ore, and the rule is to allow six pounds of quicksilver for each pound of silver, an additional 150 to 200 pounds just before washing to keep the silver amalgam in a fluid state and to promote its separation from the tailings, and seven per cent. more for mechanical loss during the process.

Those who believe in putting in a small charge at first say that by doing so they avoid mechanical loss, since the bulk of the quicksilver is not so long on the patio; others argue that this gain is visionary and does not equal the cost of putting in the quicksilver afterwards. Whatever the amount of quicksilver may be, it is emptied, ten or twelve pounds at a time, into a doubled piece of cotton cloth, and a sturdy laborer then walks all over the trilla, squeezing the cloth with both hands and flinging the quicksilver in a shower over the trilla, as it is forced in small globules through the pores of the cloth. Care must be taken not to fling any quicksilver away from the trilla on to the patio, and to distribute it uniformly; the rest of the operation is merely mechanical.

After the quicksilver has been added the treading begins again with full completeness of mules, one for each ton and a half of ore in the trilla, and continues, with one spading over, for two hours. Then the mules are again stopped and a hot solution of sulphate of copper is added. The

some amalgamators use metallic copper in a finely divided state (*precipitado*), obtained by precipitation from sulphate of copper solution on iron or zinc. That obtained by aid of zinc is supposed to be distinctly better than that obtained by iron. When used together, five parts of sulphate and one part of the precipitated copper are added to the trilla. The use of metallic

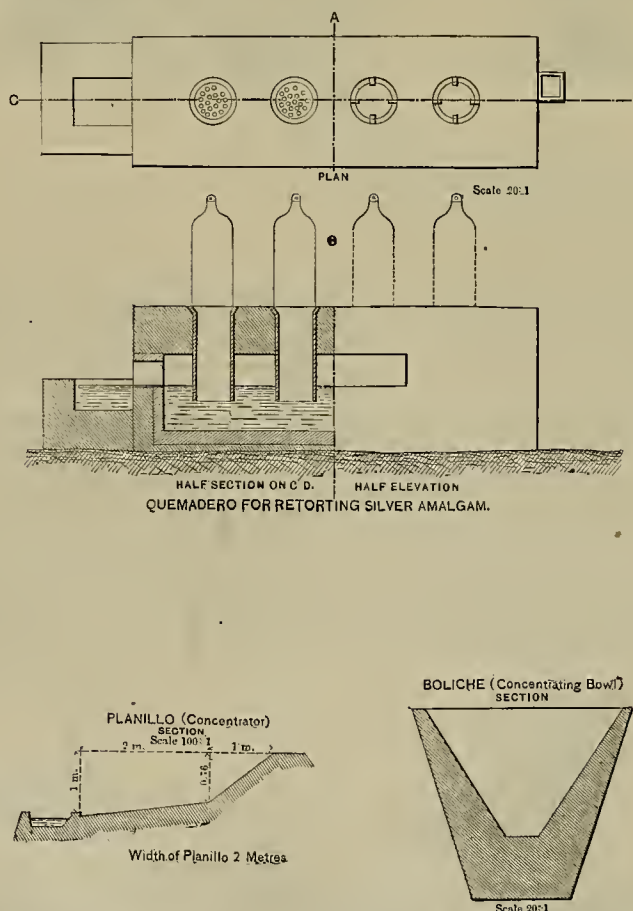
exhausting to animals not brought up to it. They are driven around in teams of not more than nine, a driver standing in the middle of each team with the ends of the halters and a big whip. The mules are made to walk in spirals so as gradually to get over every part of the mass. In large trillas two teams are often at work at the same time.

day or in the evening, when the trilla has been well warmed up by the sun's heat. The sun, indeed, is to the patio process what hot pans are to a regular silver mill. The influence of a warm, bright day upon a trilla is very great, while a cloudy or cold day retards its progress surprisingly. The progress of the amalgamation is carefully noted by means of assays (*tentaduras*), which are washed two or three times a day in the red earthen plate (*platillo*) before mentioned. This plate is about 0.18 m. in diameter, 0.007 m. thick, and about 0.02 m. deep at its deepest part.

An assay skillfully washed in such a plate presents several

Deposits of Different Substances.

The plate is held in a slanting position at the end of the washing, and the different substances arrange themselves from above downward. First there comes a silvery white crescent of amalgam (*ceja*), then a black crescent of rich sulphurets, followed by a brownish deposit of pyrites with glittering specks, which runs off into sand at the lower edge. Below all a half spoonful of water contains a little hall of quicksilver. Most of the conclusions as to the state of the trilla are formed from the appearance of the upper rim of amalgam. When this is crystalline and hard to be worked by the fingers into a coherent mass, and no globules of quicksilver can be squeezed out of it, the amalgam is said to be "dry," or "strong" (*fuerte*), and the condition indicates the need of more quicksilver. When quicksilver is present in excess, a coherent mass is readily formed under the finger, and little globules of quicksilver are easily forced out. At the conclusion of the amalgamation the trilla is said to be *rendida*, and when this is the case, the rim of amalgam is very fluid, and at a touch resolves itself into small globules, and vanishes away. When in this state, or approaching it, it is said to be weak (*debil*). A white, clear, bright appearance of the amalgam ring indicates that it is going well, while a dark, dirty color shows that something is wrong, and calls for a modification of the course of treatment. The ball of quicksilver in the lower part of the plate is also an indicator of the state of the trilla. When bright and clear, it shows that all is well, but if it is dark in color, and especially if surrounded by a dirty, furry jacket, something is very much out of order. Sometimes the signs are all right, but the amalgamation does not advance. Assays washed on successive days show the trilla to be at a standstill. This arises from a want of salt or from cold weather. Other abnormal appearances arise from too little sulphate, too



little salt, too little or too much treading. Irregularities of this kind can only be effectively dealt with after considerable experience. As a general thing, however, a trilla, when it goes wrong, is treated either for "heat," arising from an overdose of sulphate and overworking, i. e., from too energetic chemical action, or for "cold," arising from too little salt, too little sulphate, or too little treading. A heated trilla can often be restored, especially during the cold weather, by simply letting it stand a day or two, by dashing cold water over it, or by an application of lime and ashes. The heating, however, generally involves a loss of quicksilver, as the sulphurets under such circumstances seem to attack it strongly. For a "cold" trilla the treatment is to supply what is wanting. This is ascertained by taking several larger assays, of from two to five pounds each, called *jualas*. To one of the assays a little salt is added, and to another, sulphate of copper. These are worked in a little by hand, and the masses are allowed to stand in a warm place. To a third assay no chemicals are added, but the mass is vigorously kneaded by hand for some time and is then left to itself. A tentadura of the assays, made after some hours, will generally show what the matter is with the trilla.

During the working of the Trilla

Quicksilver is added from time to time, as determined by the indications of the assay, and, if everything goes well, the amalgamation ought to be finished after six or eight treadings. This desirable result depends, as has been already remarked, on the weather; gloomy, cold, and rainy days set a trilla back wonderfully, and a heavy rain will often make the mud so liquid that no work can be done on it for several days. Under favorable conditions the operation from incorporate to washing (*lana*) can be completed in 16 days; while, under unfavorable circumstances, I have known a trilla to be on the patio between five and six weeks. About three weeks is the average time of working. The best way is to pay the amalgamator by the carga of ore worked (25 cents a carga or \$1.66 a ton is the usual price), as by this system the work goes along much more rapidly than when the same man is paid a fixed salary. There is, however, a temptation to wash the trilla before the amalgamation is complete. To avoid this the proprietor should have some knowledge of the process, should give a general supervision to the operator, and pay constant attention to the assays.

As soon as the amalgamation is completed preparation must be made for washing the trilla within 24 hours. If the trilla is allowed to stand for a longer time a further action takes place, called *desecho*, in which the surplus chemicals or the sulphur attack the amalgam and cause a great loss of silver. In order to guard against this danger, and to liquefy the amalgam, the 150 to 200 pounds of quicksilver before mentioned are added as bano, and preparations are made for washing and settling.

The Ordinary Settler

(*lavadero*) is an open box of stone-work, lined with cement, 2 m. long, 0.5 m. wide, and 1 m. deep, with a platform at its mouth on which to pile up the material to be washed, a trough to fill it with water, and, at one end, a wooden gate pierced with a series of two-inch holes. These holes are kept closed by wooden plugs, and have a vertical trough outside to conduct the discharge to a quicksilver trap below.

At some haciendas of large capacity there are settlers, driven by water-power, that consist of large wooden tubs, some 2 to 5 m. in diameter by about 3 m. in depth, in which revolve vertical shafts carrying four arms. These arms are pierced with square holes, in which are inserted vertically sticks of wood about 0.06 m. square, with intervals of 0.1 m. between them, the whole combination resembling a pale fence with the edges of the pales set diagonally to the side of the fence. These dashers reach to within about 0.3 m. of the bottom of the tub. A water-wheel by means of wooden gearing turns the upright shaft, and thus the contents of the tub are kept in violent agitation. About 0.8 m. from the bottom of the tub there is a hole about 0.15 m. in diameter through which to empty the tub, when desired; and about 0.15 m. above this there is a smaller hole, about 0.02 m. in diameter, for the taking out of assays.

In the ordinary box-settler the procedure is very simple. Inside the box, instead of wooden arms driven by a water wheel, there are two men, whose business is to keep the contents in motion. The box is partially filled with water, and the men get into it with only a breech-clout to cover their nakedness, and the mud from the trilla is tumbled in, a spadeful at a time. By a dancing motion of the feet, the hands never being used, the mud is disintegrated and kept in suspension, so that the amalgam sinks to the bottom. More water and more mud are added, little by little, until the settler is filled to the highest hole in the wooden gate. The lighter tailings flow out through this hole with the water, and are conducted by a series of gutters, well provided with catch basins for quicksilver, to the settling tanks below. The muddy contents of the *lavadero* are partially discharged from time to time during the day through one of the lower holes in the wooden gate, but the amalgam goes on accumulating until the end of the operation. Care is necessary not to wash too fast, for fear of letting too much quicksilver run out of the settler, but the mass must be kept in constant agitation and not allowed to get too thick, for, if it gets too thick, the lower part of

the settler becomes clogged with tailings from which the quicksilver can be separated only with difficulty.

In the tub-settler the machinery at first is made to revolve very fast, with the tub a third full of water, and the charge is then tumbled in and disintegrated at once. The tub is then filled nearly to the brim with water, and the dasher is reduced in speed and kept moving only just fast enough to keep the sand from settling, until several assays, taken from the small hole in the side, show that the quicksilver has settled. When this stage of the process is reached, the plug closing the large aperture is knocked out, and the tailings escape into the troughs leading to the settling tanks. The time of washing a charge of 300 pounds is about one hour. There are great advantages gained in using the water-power settlers. The operation can be kept up day and night until finished, whereas, with the box settlers, a clean-up must be made at nightfall. There is less chance for the workmen to steal, since only two men are needed besides the overseer, while the box settler requires at least six men. There is less danger of the sand settling and clogging the amalgam, or of the quicksilver being carried off with the tailings; and, as a whole, the operation is under better control in every way. The first cost of the plant, however, is considerable, and, as surplus capital is not abundant in Mexico, the tub-settler is not used, except in haciendas of the first class, and I am not sure that it is not of comparatively modern introduction even in these.

Whichever method of settling is adopted, the last part of the operation consists in scraping the stones of the patio where the trilla lay, and the cracks between them, and throwing the scrapings into the settler with the last of the trilla.

The Construction of the Patio

Is simple. The common patio of the country is composed of irregular stones with surprisingly wide cracks between them. The flattest stones at hand are selected and laid in, without "facing," to be smoothed down by natural wear. The cracks are filled with clay. The loss of quicksilver is not so great as one might suppose; with skillful working on an old patio the loss should not be over seven per cent., a part of which would be due to evaporation, and a part would be splashed away by the mules or lost in the crevices of the *lavadero*. The earth underlying the patio becomes in course of years well soaked with quicksilver; so that it sometimes pays to clean it up, especially if the hacienda is to be abandoned. Efforts have been made to improve on this older style, and in one hacienda in San Dimas the patio is made of brownstone, faced and fitted with great exactness. The cost was enormous, and it is doubtful whether a year's saving in quicksilver would pay more than a moderate rate of interest on the investment. In some places patios have been paved with pine planks, tongued and grooved. In them the mechanical losses are small. They last for several years, being always kept flooded with water when not in use, and being protected besides by the strong preservative action of the sulphate of copper. I have also heard of patios built of asphalt and of artificial stone, both of which seem to be exceedingly well adapted to the purpose. Various mechanical expedients have been tried in San Dimas for the purpose of treading the trilla without mules. Rollers, wheels, and other devices have been used, but have all been abandoned. The day has gone by for investing money in an expensive plant for a process so radically defective, and the modern tendency is so manifestly opposed to such expenditure, that the most conservative Mexicans have already perceived it.

The yield of the washed trilla is chiefly found in a pool of liquid amalgam at the bottom of the settler. This amalgam is carefully dipped out, cleaned, dried, and weighed. The catch-basins in the gutter, through which the tailings had to pass on their way to the settling tanks, are also cleaned up, and the quicksilver they contained is weighed with the rest. The whole is then turned into a conical canvas bag (*manaya*) to drain. The drippings are received in a hide trough (*pila*), and decanted into flasks, being practically, though far from chemically, free from silver. The dry amalgam (*capella*) left in the bag is allowed to hang over night, and is then packed for retorting.

The Retorts of the Country

Are iron quicksilver flasks, with the bottoms knocked out, and the plugs firmly screwed in. These are first lined with brown paper, and then the amalgam is put in and rammed down firmly with aid of a wooden rammer and a heavy mallet. When all the amalgam is ready, the flasks are placed upon the furnace (*quemadero*). This furnace has a flat top, about 0.6 m. from the ground, pierced with four, six or eight holes, 0.12 to 0.13 m. in diameter, which is slightly more than the outside diameter of a quicksilver flask. From these holes pipes of the same diameter lead well beneath the surface water contained in a wooden basin below. The upper ends of the pipes are covered with iron plates pierced with many holes about 0.005 m. in diameter. Upon these plates the flasks filled with amalgam are placed, the open end downwards. A clay lute is then applied around the mouth of each flask, and the whole flask is covered with a neat coating of clay, about 0.005 m. thick. When all the flasks are in place and luted, a temporary wall of bricks is built around them, as they stand on the table of the *quemadero*, and a charcoal fire is kindled. The flasks are heated slowly until the lute and the clay coatings have dried with-

out a crack; then more and more charcoal is added until the whole mass of flasks is covered with glowing coals. The volatilized quicksilver finds its way down the iron pipes into the water, and condenses in a shining pool at the bottom of the basin. The water in the basin is constantly changing, and the condensation goes on until the operation is completed. Simple as the retorting is, it needs care. Too much heat will melt the silver, and cause it to follow the quicksilver down into the water, or it may cause a too rapid formation of quicksilver vapor and an explosion, in which a flask of amalgam, hurled high in the air, distributes its valuable contents far and wide. If the heat is too low, too much quicksilver is left behind with the silver. When the operation is properly conducted, the silver comes out in spongy bars (*plata pusa*), containing still about one per cent. of quicksilver, which can only be removed by melting the mass to an ingot. As a precaution against the possible presence of an excess of quicksilver, the purchaser of this kind of silver always has the privilege of heating the bars to a red heat before weighing them for final acceptance. If, however, they melt while undergoing the trial, the purchaser must pay for them at their weight before being put into the fire.

The quicksilver collected in the basin of the *quemadero* is not entirely free from silver. Before being put back into flasks, it must be strained through a closely woven cloth. This saves a certain amount of amalgam, called *estrujon*, which is much more pasty than that put in to be retorted. When a sufficient quantity of this kind of amalgam has accumulated, it is retorted over again. In the retorting there is a mechanical loss, from leakage, of a few pounds of quicksilver.

The Silver obtained by the patio process is almost entirely free from the baser metals and from impurities of any kind. An assay of several bars gave an average of 994-1000ths of silver and 34-1000ths of gold, leaving only 25-1000ths for the baser metals, dirt, and loss. From 70 to 75 per cent. of the assay value of the ore in silver can be extracted by careful working, though the ordinary amalgamators do not get over 72 per cent. Some amalgamators claim that they can save 80 per cent. of the assay value, but this is extremely doubtful. Of the gold in the ore at least 40 per cent. is lost, about 20 per cent. of the remainder goes with the silver, and the rest is recovered from tailings, or is caught in the tahona.

The loss of Quicksilver

In the patio process is very great. There is always a fixed loss of an amount equal in weight to that of the silver taken out; this is called *consumido*. Besides this, there is a mechanical loss on the patio and in washing of at least seven per cent., which the least carelessness may increase to 10, and there is a further loss of from four to eight pounds in the retorting, so that, in the working of sulphurets, that yield on the patio from \$60 to \$90 a ton, the total loss of quicksilver is, even under the best management, seven and a half pounds a ton; for ores of higher value, the loss is more.

The tailings from the washer run into two settling tanks, called *tangue* and *contratangue*, passing from the first into the second. A settling tank for trillas of 12 tons each is 5m. long, 3 m. wide, and 1 m. deep. In these tanks the tailings leave the heavier sulphurets and a small quantity of amalgam with the heavier parts of the sand. The lighter portions of the tailings flow through the *contratangue* to waste. There is a great difference in the contents of the two tanks. The *tangue* contains more and richer sulphurets, while the deposits in the *contratangue* are notably poorer in quality and less in quantity. In the subsequent concentrations it is customary to keep the material from the two tanks separate until a fire assay determines their fitness to be mixed.

The Concentration of the Tailings

Is preceded by washing them a second time in the chuzas, already described, for the purpose of getting out any remaining amalgam: The yield is usually three pounds or upwards, according to the size of the trilla and the carefulness of the former washing. For concentration the tailings from the chuzas are piled up at one end of a masonry platform (*planilla*), from 1.5 to 2 m. square, with a slope of 1 in 10 towards the workman. The head of the platform is a sloping wall, which leaves space to accommodate a reserve of tailings, and at the foot there is a wide gutter with plenty of slowly running water. The operator (*planillero*) sits on a board thrown across the gutter at the lower left-hand corner of the planilla, and, lifting up the water with a horn spoon, about a quarter of a liter at a time, discharges it against the foot of a heap of tailings piled up at the head of the planilla. He commences at the lower left-hand corner, continues across the planilla, and then returns a little lower down, throwing each spoonful of water in such a way that it spreads out without splashing, and overlaps a little the area covered by the preceding one. When he has gone over the whole surface of the planilla in this way some four or five times, the sand has been partially washed away from the heavy sulphurets, which have settled near the upper part of the planilla, while the sand has worked along down to its lower end. The operator then removes the sand from the planilla for about one meter upward from the gutter and throws it away. The remainder of the layer on the floor of the planilla he mixes up with the tailings at the head, and begins to throw on water as before. When the supply of tail-

ings at the head is exhausted, more are added and the process continues until all the tailings have been washed, and there is left on the planilla a black heap of sulphurets (*polvillo*.) In order

To Concentrate the Sulphurets

A little more and to extract the last traces of amalgam it is customary to put them through still another process, called *bolicheo*. This is performed in a wooden bowl, called *boliche*, whose cavity is shaped like an inverted cone, somewhat truncated, 0.62 m. in diameter, and 0.4 m. deep. Some boliches are 0.8 m. in diameter and proportionately deep; but, as they are made of a single piece of wood, such large ones are rare in San Dimas, which is "a long way from tall timber." Portions of the sulphurets are placed in such a bowl with plenty of water, and are vigorously stirred for some minutes, after which they are allowed to settle. During the settling, the outside of the bowl is tapped briskly with a heavy stick or mallet. This tapping is continued until the sulphurets settle down firmly and solidly in the bottom of the bowl, with all the water on top. The water is then absorbed by woollen rags and removed. On the top of the sulphurets there is a layer of pure sand. Below the sand there come first a layer of poor, brownish sulphurets called *colas*, and then the rich black sulphurets (*polvillo*). In the bottom of the bowl there is a small amount of liquid amalgam.

The *colas*, when a heap of them has accumulated, are roasted preparatory to working on the patio. The roasting furnace is made by spreading on the ground a layer of wood and kindlings, over which is spread a layer of *colas* about an inch thick; over the layer of *colas* there is another layer of wood, followed by another of *colas*, and so on alternately, always leaving a central opening, until a conical mound has been formed. The *colas* are put on wet, so as to be more easily handled. The mound, when completed, is covered with earth, set on fire, and allowed to burn out. In this method of roasting, one portion is over-roasted and sintered; a little is roasted just right, and the rest is under-roasted. The whole mass is mixed with sand, ashes and half-burned sticks. The sticks are taken out by hand and the mass of *colas* is thrown into a tahona to be re-ground. It is afterwards mixed with ordinary ore and worked on the patio.

The concentrated sulphurets are sent to the port of Mazatlan, and thence shipped to Germany for account of mine, to be worked in the government establishments there. Notwithstanding high freights, etc., the returns are from 15% to 20% better than would be obtained by sending the same sulphurets to San Francisco. The forwarding houses in Mazatlan usually make an advance of 70% or 75% on the assay value of the sulphurets, for which no interest is charged unless the returns are delayed beyond a certain number of months. The first-class ores mentioned above are sent in the same way.

The Cost of Working Ore

Upon the patio is very great. The following figures are from a hacienda where ores were worked whose average yield was \$60 a ton:

Process.	Cost per ton of 2000 lbs.
Breaking, grinding, and use of tools.....	\$1 52
Amalgamator's wages.....	1 40
Scraping tahonas.....	13
Carriage of slimes from tahona to patio.....	60
Mules.....	1 73
Labor.....	1 80
Salt.....	2 80
Sulphate of copper.....	1 33
Charcoal, for retorting and assaying.....	33
Quicksilver.....	4 68
Salaries, general expenses, etc.....	6 66
Repairs.....	2 33
Concentration of sulphurets.....	2 26
Total.....	\$27 58

The cost does not include cost of superintendence nor interest on cost of plant. The trillas upon which this calculation was based were small, averaging only ten tons. The expense of trillas of from 15 to 25 tons would be proportionately less in the items of scraping tahonas, mules, labor, repairs, and general expenses, and there would also be a smaller mechanical loss of quicksilver.

In a large hacienda, where the tahonas are in two groups and were worked by gearing from an over-shaft water-wheel; where the breaking was done by wooden stamps shod with iron, and also driven by a water-wheel; and where the washing was done in a water-power washer, the charges in detail for working a trilla of 19 tons, were as follows:

Process.	Cost per ton of 2000 lbs.
Breaking, grinding, and use of tools.....	\$6 86
Amalgamator's wages.....	1 66
Scraping tahonas.....	16
Carrying and washing scrapings.....	11
Concentrating tailings of scrapings.....	97
Carrying slimes from tahona to patio.....	42
Mules and keeping.....	3 72
Labor, spading trilla, and mule driving.....	1 69
Labor, washing trilla.....	56
Charcoal for retorting silver.....	47
Concentrating tailings of trilla.....	2 06
Materials:	
Salt.....	2 53
Sulphate of copper.....	1 65
Precipitated copper.....	87
Quicksilver.....	4 37
Total.....	\$26 91

The total cost of \$26.91 a ton for custom work in this hacienda includes a charge for profit to the owners on all the items except the four items of "materials," which were originally higher priced; they have been reduced to the same prices as in the other table to facilitate comparison. To the owners of the hacienda the cost of beneficiating would certainly not exceed (CONTINUED ON PAGE 192.)

Geography and Climate.

Magnetic Declination.

every degree of latitude we travel to the north.

General Geological Characteristics.

I have noticed on the coast of Vancouver's island and the main land that the striations made by ice action on the rocks are very distinct, and indicate an ice motion toward the south-

all located round one elevated quaquaversal point in the Rocky mountains, namely: Mount Brown, which attains an altitude of 19,000 ft. From this point the Fraser and Columbia rivers trend away towards the south. The Assiniboine toward the east and the Athabasca and Peace rivers run northerly and discharge their waters into the great Mackenzie river, which empties itself into the great polar basin. This river,



The evidence of the glacial age are everywhere apparent. Professor Richardson considers that one large glacier, 50 ft. miles in length and 600 in thickness filled the Straits of Georgia. Observations made by him in the northern part of the straits show where the source of the great glacier must have been ice action to a height of over 3,000 ft. being exhibited. In the interior plateau of this region there is a system

The principal rivers of British Columbia are

the Hudson Bay Co. officials say has a course of 2,500 miles from its source and is navigable for steam boats for 1,200 miles. But its mouth must forever remain ice-barred against navigation. No salmon have ever been caught in any of the head waters of this river; but in the Fraser and Columbia rivers before alluded to, also in Stickcen Nass, Skeena and other rivers which head in the Coast range the finest salmon are found. The coast and inlets of British Columbia are also well stocked with many kinds of salt water fish. A good many

salmon canneries are in operation during the fishing season on the Fraser, Nass and other rivers, and a large number of cases are shipped abroad.

The staple commercial timber of British Columbia is *Pinus Douglasii*. This is largely manufactured and shipped abroad. I have seen sticks of this timber 180 feet in length almost clear of knots. It grows to the 52 parallel of

east of the Mississippi river cease to be productive, and the shales and sandstones associated with the coals of the East are gradually replaced by limestones which underlie the great plains. The coal mines of British Columbia, and no doubt the whole of the Pacific coast, belong, first, to the lower cretaceous, holding the anthracites of Queen Charlotte Islands; secondly, cretaceous rocks holding the Nanaimo coals; thirdly,

PLACE.	Thickness of seam in feet.	Water.	Combustible matter.	Fixed Carbon.	Ash.	Sulphur.
Queen Charlotte Island, Anthracite & c.	3 to 4	1.60	5.07	85.75	6.69	0.83
Vancouver Island, Newcastle Coal	3 " 4	.....	35.49	52.57	11.94	.....
Wellington (Dunsmuir).	.....	.....	.....	.....	.....	.....

North Thompson river, bituminous coal of good quality; Lillooette, bituminous coal; South fork Similkameen river, lignites; Lightning creek (Cariboo), lignite; Fort George, lignite; Peace river and Pine river, beds of bituminous coal; Parsnip, Nechacho and Chico rivers, lignite. The Skeena river is also said to flow through an extensive formation of coal beds, from 3 to 35 ft. thick. On Vancouver's island coal has been found at Quatsino sound, Beaver harbor, Fort Rupert, Alberici canal and Cowichan bay. By a process of inductive reasoning, assuming as premises the localities and figures given in above schedule, we arrive at these conclusions: That the coals of the north contain the greatest amount of fixed carbon, and those toward the south gradually become more bituminous and less carboniferous until the coals of the Fraser river basin and Puget sound are reached. These assume some of the characteristics of lignite, and of course are of inferior quality to any of the preceding varieties.

According to the private circular of J. W. Harrison, the receipts of coal for the past year, at the harbor of San Francisco, were 846,000 tons. The portion of this amount received from British Columbia was only 151,800 tons. When we consider that the coal fields immediately trending along the coast of British Columbia have been estimated to cover an area of 3,000 square miles, the amount of coal raised and shipped to the San Francisco market looks very small, although the price paid by retail was very liberal, namely, about \$12 per ton. (Coals in Colorado are put on the cars for \$2 per ton). As a change of government has lately taken place in British Columbia, it is to be hoped that a more enlightened and statesmanlike policy will prevail than in the past, and that coal lands which have been reserved from sale during past years will be sold to enterprising capitalists (not monopolists) on this coast to open up. This policy would lessen the price of coals in San Francisco and greatly enhance the wealth and prosperity of British Columbia generally.

Some 300 square miles of anthracite coal fields are said, by Professor Richardson, to be located on Queen Charlotte island. This coal gives 85 per cent. fixed carbon, and equals the best Pennsylvania coal.

The total thickness of rocks associated with the coals of British Columbia are the following, in descending order: Upper conglomerate, 320 feet; upper shales, 776 feet; middle conglomerate, 1,100 feet; middle shales, 76 feet; lower conglomerate, 900 feet; lower shales, 1,000 feet; productive coal measures, 739 feet; or in round numbers, about 5,000 feet. The thickness of rock associated with coals in the eastern states of America is 15,000 feet, and in England about 11,000 feet. The tertiary coal measures of the Sound and Bellingham bay are continuous north of the 49th parallel, and must underlie nearly 1,000 square miles of the low country about the estuary of the Fraser river.

Localities of Other Minerals.
It will be proper to consider some of the other places where the economic minerals of commerce are found in this region. Iron is found widely distributed over the country. Some of the principal localities are Texada island (magnetic); Queen Charlotte island (clay, iron, stone associated with coal); Iron mountain, Nicola, specular iron; Cherry Bluff, Kamloops lake, (magnetic); and Baynes sound (clay, iron, stone associated with coal). Assays: 36.83 metallic iron.

Copper is found at the following places: How Sound (copper or eubecite masses have assayed \$75 per ton silver), Sansone Narrows, Dean Canal, Harrison river (purple copper), Fort George, Copper Island, Copper Creek and Homathco river. Antimony (Stibnite) is found at Little Shuswap Lake, and at Kumsishaw, Queen Charlotte sound.

A very large deposit of quicksilver has been found on the Homathco river; also float ore on Watson Creek, Fraser river.

Platinum is found in scales on Similkameen river.

Silver is found at the Eureka mine, Fort Hope (rich ore, bromide), Cherry Creek (rich ore, assays from \$300 to \$5,000 per ton not yet prospected, Freibergite). Vital Creek (Omineca argenterite) assays 83 per cent. silver (specimen at State Mining Bureau, San Francisco) Similkameen river. Quantities of silver have been found in gold placers on Francis river and Quartz Creek Cassiar (a vein which has assayed \$200 per ton exists there), Cowichan, Vancouver's island (argenteriferous galena); and on the



north latitude on the coast. Further north white cedar and spruce are large and abundant.

Minerals of British Columbia.

Regarding the minerals of British Columbia, I shall in the first place note its coal formations and coal. A line drawn on the 97th meridian of west longitude from Greenwich pretty exactly separates the coal-bearing formations of America into two classes. West of eastern Nebraska, the carboniferous formations which yield the coals of Nova Scotia, and the States

the tertiary formation with its bituminous coals and lignites of the Fraser river and Puget sound basins. The rocks associated with the cretaceous and tertiary coals are superimposed upon the crystalline rocks. The mountain limestone which forms the base of the carboniferous coals to the east of 97th meridian, above stated, is waiting on the Pacific Coast. The following schedule will show the localities where coals have been found in British Columbia, and an analysis of some varieties of them;

seam).....	4 " 6	.....	34.70	55.50	9.80	.....
Brown River (Comox)	4 " 5	.....	21.57	73.14	4.34	.....
Trant	3 " 8	.....	28.50	62.76	7.82	.....
Union Mine	5 " 10	1.70	27.17	68.27	2.86	.....
Baynes Sound Mine	5 " 6	.....	29.55	61.70	5.75	.....
Malinad, Br Columbia	15 " 3	.....	21.11	74.58	3.91	.....
Nicola River	42 " 46	8.60	35.51	43.84	9.15	.....
Hak Creek	5	.....	35.73	63.86	0.41	.....
Chilliwack	.....	.....	.....	.....	.....	.....
United States	.....	.....	.....	.....	.....	.....
Seattle Coal, Puget Sd	.....	11.60	35.45	45.97	6.44	.....

* Fine coke.
† 50 miles from mouth of Fraser river.
Other localities where coals have been found, but have not been analyzed, are as follows:

Kootenay country to the east of the Columbia river, ledges of gold and silver quartz have been found.

Gold is found in placer diggings at Cariboo, Omineca, Cassiar and Kootenay. Average number of miners employed 3,220; average earnings \$658 per year; total and actual estimated yield of gold from 1858 to 1876, \$38,166,970—and calculating on this basis up to the present time and deducting 25 per cent. for exhausting of placers, the amount would be \$47,708,713 up to 1882. This gold was all taken from placers. No quartz mining is carried on in British Columbia, although some excellent ledges have been found. (Facts taken from Government reports).

Railroads.

It is the intention of the Dominion government, that their contractor, Ouderdonk, will have the railroad completed from Port Moody on the sea board, to Savanas Ferry by next year. The line located by the Dominion government surveyors trending north, is to be abandoned, and Colonel Rogers explored line for the syndicate, adopted in its place. This change will shorten the distance east some 150 miles, but will increase the altitude of summit level of railroad over the Rocky mountains some 1,000 ft., namely, from 3,700 ft. to nearly 5,000 ft; but as Rogers' line runs across the mountains about two degrees of latitude, or about 138½ miles further south than the first located line, the difficulties to be overcome, caused by winter snows, may not be greater, and the cold not more intense.

The Mining Laws.

Any man is allowed by law to take up 1,500 feet along a lode of quartz, and 300 feet on each side of the center line, measured on a line at right angles with said center line.

The dips, spurs and angles of the lode can be followed although said dips, spurs and angles may diverge outside of the vertical planes bounding the said claim produced downward from the superficial boundaries.

The qualification of citizenship is not necessary as in the United States, but only applies to cases of land pre-emptions for agricultural purposes.

Any man, whether an alien or otherwise, can purchase coal land on the west side of the Cascade range of mountains for \$10 per acre, and on the east side for five dollars per acre.

Agricultural land can likewise be bought in any part of B. C. for one dollar per acre.

Alaska.

The number of men at present employed in mining pursuits in this region is about 600. Extensive quartz lodes have been found in Douglass island, near Harrisburg; the assay value of rock is not high, but the extent of the lodes and their proximity to the salt water make them valuable. Two quartz mills of five stamps each are at work on the quartz lodes. The geological formation along the Alaska coast is (Crystalline), clay, slates and granite. An examination of the coast extending to 150 miles north of Fort Simpson was made by Professor Richardson, Dominion Geologist. The fisheries are extensive and doubtless the same enterprise which has developed the resources of the Pacific Slope will make it a prosperous territory. Authorities consulted; Professors Richardson, Selwyn and Dawson, Dominion Geologists, Professor Dove's and Professor Bache's charts, and my own observations, extending over a space of time amounting to 22 years, during which time my business as land surveyor and engineer necessitated my traveling over the region of country before described. To Capt. Oakford I am indebted for the foregoing information about Alaska.

W. D. PATTERSON.

THE SANTA RITAS.—The Tombstone *Republican* says: More than a passing interest is now being taken in the Santa Rita mountains; several important sales of mining property having lately been made, and good ore bodies developed in many places. The opening of the Sonora branch of the Atchison, Topeka & Santa Fe railroad has had much to do with this mining revival in the Santa Ritas, giving as it does an opportunity of shipping ores at a profit which could not formerly have been made. Crittenden station, on the Sonoita, the point of shipment for the Santa Ritas and Patagonias, is a scene of bustling activity. New depot buildings, stores, saloons, blacksmith shop, etc., are being erected, and a lively town will doubtless be the result. Several car-loads of sacked ore were observed there, ready for shipment to the Benson smelter.

THE WORLD'S OBSERVATORIES.—Some interesting statistics of this public observatories of the world have just been published. Their number is 118; 84 being in Europe, 2 in Asia, 2 in Africa, 27 in America, and 3 in Oceania. Of the European observatories Prussia has 29, Russia 19, England 14, Italy 9, Austria 8, France 6, Switzerland 4, and Sweden 3; Spain, Portugal, Holland and Norway each possess 2, while there is only one in Greece, Belgium and Denmark. The most ancient observatory in Europe, and in the world is that of Leyden, having been founded in 1632; then come Copenhagen, founded 1637; Paris in 1667; and Greenwich, in 1765. The Moscow observatory is the oldest in Russia, dating from 1750. Prussia, now the richest country in the world in astronomical observatories, had none before 1805.

A SURE cure for impoverished blood, pimples, and sallow complexion, is Brown's Iron Bitters. It will produce a healthy color, smooth skin, and is absolutely not injurious.

Mining Regions of British Columbia.

Although British Columbia is not very far away from us in California, the miners here know little of the region, and the miners up there know little of our systems here. We have endeavored in this number of the MINING AND SCIENTIFIC PRESS to collate such facts as are of general interest concerning British Columbia and present them with a map, so that a clear understanding of the features of the province may be gained.

To use the words of George M. Dawson, whose several invaluable reports form the principal source of information on this region, and will be liberally drawn upon, "it may be said, without any exaggeration, that there is scarcely a stream of any importance in British Columbia in which the color of gold cannot be found." The gold discoveries made in 1858 led to a great influx of miners in that and the following year.

The annexed table shows the actually known and estimated yield of gold, number of miners employed, and average earnings per man from the year 1858 to 1881.

Year.	Am't actually known to have been exported by Banks, etc.	Add ½ more, estimate of gold carried away in private hands.	Total.	No. of Miners employed
1858	\$ 390,265	\$ 130,088	\$ 520,353	3,000
1859	1,211,304	403,768	1,615,072	4,070
1860	1,371,410	557,133	2,228,543	4,400
1861	1,999,589	666,529	2,666,118	4,200
1862	3,184,700	1,061,560	4,246,260	4,100
1863	2,91,848	933,962	3,755,850	4,400
1864	2,618,404	872,801	3,491,205	4,201
1865	1,997,580	605,526	2,603,106	2,982
1866	1,800,651	639,217	2,439,868	2,644
1867	1,779,729	593,243	2,372,972	2,390
1868	1,331,234	443,744	1,774,978	2,300
1869	1,062,717	334,239	1,396,956	2,348
1870	1,349,580	440,860	1,790,440	2,450
1871	1,208,229	402,743	1,610,972	2,400
1872	979,312	326,437	1,305,749	2,300
1873	1,383,404	461,154	1,844,558	2,868
1874	1,800,651	639,217	2,439,868	2,644
1875	1,339,056	446,062	1,785,648	2,202
1876	1,206,130	402,464	1,608,594	1,960
1877	1,062,070	352,534	1,414,604	1,883
1878	1,062,070	352,534	1,414,604	1,883
1879	1,062,070	352,534	1,414,604	1,883
1880	844,840	281,971	1,126,811	1,955
			\$46,140,889	

These statistics are from official sources at British Columbia. The statistics of the last two years, compiled by Mr. Valentine, of Wells Fargo & Co's express, are as follows: For 1881, \$872,600; for 1882, \$671,845. This makes a total product of \$46,685,334.

The gold yield there shows a fluctuation year to year, which is due not only to the uncertainty of the deposits worked and number of miners employed, but also depends on climatic conditions.

The very general distribution of alluvial gold over the province may indicate that several different rock formations produce it in greater or less quantity, though it is only where coarse or heavy gold occurs that the original auriferous veins must be supposed to exist in the immediate vicinity of the deposit. "Colors" travel far along the beds of rapid rivers, and the northern and other systems of distribution of drift materials have, no doubt, also assisted in spreading the fine gold.

Gold Formation Proper.

The gold formation proper, however, consists of a series of talcose and chloritic, blackish or greenish-gray slates, or schists, which occasionally become micaceous and generally show evidence of greater metamorphism than the gold-bearing slates of this State. Their precise geological horizon is not yet determined, no geological survey to that end having been made; but Dawson is inclined to believe that they will be found to occupy a position intermediate between the more distinctive members of the Lower Cache creek group of Selwyn's first provisional classification of the rocks of B. C. (Rep. Prog. Geol. Survey, 1871-72, p. 61), and the base of the overlying mesozoic rocks, called in Dawson's report for 1878 the porphyritic series. If this be so they are probably the geological equivalents of some of the richest auriferous rocks of the State. By the inundation of the auriferous veins traversing these rocks the gold has been concentrated in the placers.

The greatest areas of these rocks appear in connection with the disturbed region lying next to the Rocky Mountain range, known in various parts of its length as the Purcell, Selkirk, Columbia, Cariboo, and Omineca ranges. Other considerable belts of auriferous rocks, however, probably belonging to the same age occur beyond the region, as in the vicinity of Anderson river and Boston bar on the Fraser; at Leech river, Vancouver Island and elsewhere.

The Cariboo District.

Discovered in 1860, has been the most productive and permanent. The 53d parallel of latitude passes through the center of the district, which has been described as a mountainous region, but is rather to be regarded as the remnant of a great high-level plateau, with an average elevation of 5,000 or 5,500 feet, dissected by innumerable streams, which flow from it in every direction, but all eventually reaching branches of the Fraser river.

As in all new gold mining districts the shallower placer deposits and gravels in its present stream courses first attracted attention, but with the experience of California and Australia, it was not very long before the deep diggings were found to be by far the most profitable. Williams and Lightning creeks yielded the greater part of the gold. The old stream courses of the Cariboo District pursued much the same course as their present representatives follow, running back across but never leaving the old valley, or running across the modern drainage system as is so often the case in the deep placers of California and Australia. There are many other localities in the district, which many believe would prove rich in the deep ground if properly prospected.

Auriferous Rocks.

In most gold bearing countries, the placer mines though often rich, have eventually led to the mining and treatment of the auriferous quartz from which the alluvial gold has been denuded. In British Columbia the alluvial deposits have thus far absorbed the mining energy of the country, but in view of the diminished yield of the best known placers, and the inevitable more or less complete exhaustion of deposits of this kind, attention should be turned soon to the quartz mines. Though much of the gold accumulated in the beds of old streams may have been derived from veins too small to work individually, it seems to scarcely admit of a doubt that in a region where so large a quantity of gold has been maintained within so small an area, rich lodes will be discovered and worked. Vein mining once initiated, Dawson thinks, will rapidly develop.

The districts of Kootenay, Omineca, and the Cassiar region, situated in the same belt of auriferous rocks, in the main features of their deposits resemble those of Cariboo. There are also several other localities in the line of the main development of the auriferous rocks, which have from time to time attracted attention and yielded more or less gold, but from their inaccessible position, limited character, poor pay, or depth of cover, they have been abandoned or allowed to fall into hands of Chinamen.

The greater part the gold range, especially towards the north, is very densely timbered and covered with moss, partly swamp and tangled vegetation, rendering its examination very difficult, and the discovery of the rich spots a matter requiring time and labor. In this respect it differs altogether from the character of ground that prospectors work in this State.

Cassiar.

Most miners will remember the Cassiar excitement of a few years since. The country was rather a disappointing one, and what California miners went made little by it. This is the most northern discovery on the auriferous belt in British Columbia, being situated about north latitude 59°, and separated from Omineca by over 300 miles of rough country, unknown geographically, and scarcely prospected. Gold has long been known on the lower part of the Stickeen river, by which Cassiar is approached by the coast; but it runs there in light, scaly particles, like those found in many places on the Fraser.

The deposits of Cassiar lie on the sources of the river Dease, and about Dease lake, the upper end of the latter being separated by only a few miles of low country from a part of the Stickeen. The Dease empties into the Mackenzie and this passes into the Arctic sea. The gold field is about 300 square miles. Dease and McDame creeks, the most important, are 100 miles apart. Discoveries have been pushed northward and eastward on river systems connected with the Dease, to an estimated distance of 370 miles in a region which probably lies beyond the province of B. C., in the Northwest Territory. The Cassiar mines are worked under great disadvantages. Situated in almost Arctic climate, where the soil is permanently frozen at a small depth below the surface on

the shady sides of the valleys, and a short season during which floods are liable to occur; a country difficult of access; high prices of provisions; only the highly auriferous character of some parts of the region make it at all attractive. The existence of these rich deposits are important as showing the continuity of the auriferous belt of the country.

It is scarcely necessary for us to refer to any length to the Fraser river gold deposits, the first to attract notice, but rich in only a small portion of their extent. Most early Californians will remember the great Fraser river excitement which took thousands from the mines of this State and nearly depopulated many of our towns. It was thought a second "49" was at hand. The gold occurs all along the course of the Fraser, but the mining is now done mainly by Chinamen and Indians.

In Vancouver Island, Leech River district, about 20 miles from Victoria, attracted attention at one time, and yielded considerable gold from a small area. Gold in small quantities has also been found in other parts of Vancouver Island, but the forests are so thick, little prospecting is done.

Where Gold is Found.

Gold has seldom been found *in situ* in the southern portion of British Columbia, but occurs in remunerative quantities in placer deposits in a number of places. These are generally found to lie on, or in the immediate vicinity of certain black, slaty rocks, from quartz veins traversing which the alluvial gold appears to be derived. In the search for gold placers, the extent and distribution of these slaty areas consequently become important, and though only a portion of the streams flowing over these slaty regions hold gold in paying quantity, a knowledge of their position may serve to deter too great expenditure of time in prospecting places probably barren, and turn attention to regions which promise better. These slaty rocks are those which have frequently been referred to by Dawson as included under the Anderson river and Boston bar series of the preliminary classification.

On the lower part of Fraser river, embraced in the district under discussion, no important gold-yielding bars or benches can now be mentioned, though this was the first region to attract the attention of the gold miner to B. C., and yielded largely in the earlier days of gold excitement. Here it would appear as the result of mining that the richest bars, and those yielding the heaviest gold, were found precisely in that part of the river which is occupied by the slaty rocks previously mentioned. The rapid character of the river has, however, led to the distribution of the finer particles of gold throughout its entire course. No deposit of any great extent, as rich as those at first worked on the Fraser, is again likely to be found, as the valley is generally quite narrow, and the upper benches, as well as the bars near the level of the stream, have been well prospected. A considerable quantity of gold is, however, still obtained from the Fraser, when the water is at a low stage, for the most part by Chinamen and Indians. It is also probable that the California hydraulic method may be applied to many of the benches with profit.

From the Thompson, near Nicommen, the first gold known to have been found in B. C. was brought (in 1857), and this locality has continued to yield a considerable quantity of gold at its lowest stages of water. The gold is in large particles, and is obtained by the Indians in crevices among and beneath the stones in the river. No rocks of the slaty series are known near this place, or for some distance above it. Mr. Alfred G. Lock, in his recently published valuable work on "Gold," where these facts are summarized, thinks "it is not improbable that the gold may here be derived from some of the igneous rocks of tertiary formation. The occurrence of gold in rocks of igneous formation in such quantities as to produce paying placer deposits has lately been distinctly proved in several cases in other parts of the world, and should be borne in mind." On the Nicola river gold in thin scales has been found for about 18 miles above its confluence with the Thompson.

Tranquille river flows into Kamloop lake; was worked before 1862, and has afforded occupation to a varying number of miners every year since. It has almost entirely fallen into the hands of Chinamen now.

On Louis creek, in the lower part of the North Thompson, gold mines have been worked.

On the South Similkameen, a short way above Vermilion forks, gold mining has been carried on for several years, though now the Chinese have possession. The Tulameen or north fork of the Similkameen, though yielding "prospects," has never given remunerative employment. Further down the Similkameen gold has been found in a few places, notably at Twenty-mile creek, where it was worked for some years. Gold in small quantities has been found in several streams flowing into the Okanagan valley, but few mines of any importance are there. The best deposits of Mission creek have been worked though the high benches may pay for hydraulic. Cherry creek, a tributary of the Shuswap river, still gives employment to a few white miners and a number of Chinamen. Scotch creek, flowing into Shuswap lake from the north, has yielded some heavy gold, but no mining is now going on there.

In the Queen Charlotte Islands no alluvial gold seems to have been found, but auriferous quartz exists in some quantities.

Other Localities Yielding Gold.

The map which Mr. Patterson has prepared for us for this edition of the MINING AND SCIENTIFIC PRESS, shows the various streams, as much in detail as the scale would admit, but of course many of the smaller ones could scarcely be shown. Still a very good general idea of the country is given. The following is a summarized list of the localities in British Columbia known to yield gold, with notes of their present condition so far as can be gathered.

Cariboo District.

Williams Creek and its tributaries—McCallum's gulch, Walker's gulch, Mink gulch, Grub, or Black Jack gulch, Stout's gulch, and Conkling's gulch. McArthur's creek, worked out for drifting and no hydraulic work in progress. Lowtree creek, some good ground being still worked; water scant for hydraulic. Jack of Clubs creek, all deep work, gravel being 150 feet deep near the mouth. This creek is a favorite among those which are considered yet unprospected; the impression prevailing that an old channel exists which has not yet been found.

Creeks entering Willow river are as follows: Mosquito creek and Red gulch, worked out for drifting but paying by hydraulic; Whipsaw creek; Sugar creek; Grouse creek, deep ground worked out; Antler creek, Chinamen working on benches; Pleasant Valley, never bottomed or much prospected, but might be embraced in a scheme for draining Williams' creek; Bear and Swamp creeks, in good pay; Cunningham creek, a crevice with 600 ounces of gold was once found here, several hydraulic claims at work in successful attempts to reach the deep ground; Harvey's creek, first gold in paying quantity in the Cariboo district was found here in 1860.

Creeks on the north side of Cariboo lake: In Nigger Pine and Goose creeks small quantities of gold have been found; Keithly creek; Snowshoe creek, east branch deep ground not prospected; Duck, Black Bear, Cedar, Harzeline, Moorehead, French, Canadian, Canyon creeks, and Quesnelle and Swift rivers, are all in this region.

The chief tributaries of Lightning creek are: Amador, Van Winkle, Chisholm, Last Chance, Davis, Anderson and Jawbone creeks. There are many quartz veins, but so little has been done on them it is scarcely worth while enumerating them.

In Cassiar District are the following localities where gold is found: Stickeen river, nearly exhausted; Dease creek probably yielded \$700,000; Thibert's creek, part still paying; Brady creek; Eagle river; McDame's creek, the work important in the region, being worked in several places and will yield for some years largely; Snow creek, bench diggings still mined extensively; Quartz creek and Rosella creek worked out nearly; Dennis, Patterson, Gold and Slate creeks; Somer's creek, number of tunnels being worked; Spring creek, De Leard river and Rapid river.

In Omineca district are several creeks but not many mines working. The same is the case in Kootenay district. The Great Bend country is now almost abandoned.

Other Districts

The Parsnip river, draining the Omineca country, has proved remunerative in several localities. The bars on Findlay river yield, but

headwaters have not yet been prospected. The Fraser river we have previously spoken of. McLennan creek does not pay. Nechaco river shows colors; same with Chilaco river; Chilicotin river, some gold near mouth. Bridge river has heavy gold. Lilloet river, flowing into Harrison Lake, has some gold. South and North Thompson rivers show gold. Among other gold-yielding streams, are Scotch creek, Main river, Thompson, Anderson river, Coqui halla, Nicola, Bompante, Horsely, Skagit, Similkameen, Okanagan, Kettle, and Lower Himathio rivers, and Hat, Mission, Rock, Boundary, Seymour, and Prospect creeks.

On Vancouver's Island, Leech river has proved auriferous for four miles of its length. The rich ground is exhausted, but the banks of drift and cement might pay for working by hydraulic method. Sooke river, Goldstream brook, Jordan and Nanaimo rivers all show some gold.

The annexed table shows the condition of the auriferous industry in British Columbia in 1880, which is as far as full statistics are procurable. It is noticed that no quartz mining is mentioned, and but little is carried on.

NAME OF BAR, GULCH, CREEK OR RIVER.	Companies Working.	Men employed in Season.	Estimated value of gold for the year.	Total.
CARIBOO.				
Barkerville Division:				
Williams' Creek.....	25	99	\$79,000	
Conkling's Gulch.....	4	16	24,700	
Grouse Creek.....	4	21	9,800	
Antler Creek.....	15	35	16,600	
Cunningham Creek.....	4	20	6,200	
Lowtree Creek.....	4	25	21,200	
Mosquito Creek.....	5	14	10,000	
Canadian Creek.....	1	2	500	
Harderabla Creek.....	1	4	2,500	
Jack of Clubs Creek.....	4	33	16,100	
Stout's Gulch.....	2	15	8,400	
Sundry other claims.....			24,000	
				\$210,000
Lightning Creek Division:				
Coulter's Creek.....	1	3	\$200	
Peter's Creek.....	1	13	900	
New Creek.....	1	7	400	
Barry Creek.....	1	6	400	
Burns' Creek.....	4	18	3,700	
Chisholm Creek.....	3	8	1,800	
Fountain Creek.....	2	14	5,700	
Anderson Creek.....	1	3	.....
Parkins' Gulch.....	3	7	1,800	
Davis Creek.....	12	5,500		
Swift River.....	10	3,800		
Slough Creek.....	1	3	400	
McGinty Creek.....	1	4	700	
Nelson Creek.....	20	20,745		
Conkling River.....	6	22	4,740	
Last Chance Creek.....	3	9	945	
Basford Creek.....	1	2	.....
Deadwood Creek.....	2	8	1,100	
Ruchon Creek.....	3	6	2,200	
Lightning Creek.....	12	45	25,400	
				70,530
Keithley Creek Division:				
Snowdon Creek.....	14	70	\$44,100	
Keithley Creek.....	10	58	19,300	
North Fork Quesnelle River.....	5	38	8,900	
South Fork Quesnelle River.....	5	30	10,400	
Quesnelle River, Upper	40	11,000		
Various gulches & bars			5,000	
				68,000
Quesnellmouth Division:				
Quesnelle River, Lower	120	830,000		
Fraser River, Quesnelle to Soda Creek	1	21	7,700	
Fraser River, above Quesnelle.....	84	18,000		
Hickon Creek and Tributaries.....	50	15,000		
Desultory mining.....			5,000	
				75,700
CASSIAR.				
Laketon Division:				
Dease Creek.....	35	157	\$60,000	
Thibert Creek.....	20	140	57,000	
Defot Creek.....	12	40	15,000	
				133,800
McDame Creek Division:				
McDame and adjacent Creeks.....	61	245	120,000	
				120,000
LILLOOET.				
Fraser and Bridge Rivers:				
McGillivray Creek, Anderson lake.....	3	104	9,100	
Indian and Chinese mining (no records).....	1	5	700	
				72,700
				82,500
KOOTENAY.				
Wild Horse Creek.....	23	67	\$16,000	
Perry Creek.....	1	6	2,000	
Weaver Creek.....	2	4	1,000	
Palmer's Bar.....	1	3	500	
				10,500
KA LOOPS.				
Tranquil River.....	4	13	\$2,000	
				2,000
YALE AND HOPE.				
Fraser River and tributaries, Hope to 34 mile bar.....	13	63	\$10,800	
				10,800
OMINECA.				
Manson Creek.....	11	20	\$6,000	
Black Jack Creek.....	4	16	6,500	
Cernansan Creek.....	7	24	15,000	
Vital Creek.....	1	20	12,700	
Various creeks & gulches	4	17	5,600	
				45,800
Totals.....	373	1960	\$386,630	

Of the companies working, shown by number in the table, 271 were getting gold and 28 prospecting. Of the whole 373, there were 3 bar claims, 178 creek claims, 50 bench claims and 83 hill claims. Of all these, 21 were worked by rockers, 205 by sluices, 41 by hydraulic, 25 by shaft and 21 by tunnel.

Tramps.

With the warm days and beautiful weather, comes the old complaint from all parts of the country of annoyance from tramps, and a revival of the question, what shall we do to check this stream of able-bodied vagrants and bummers. The tramp is a very old stager in the world, and his footsteps may be traced along the ages from the vigorous laws enacted against his vagabond habits and ways; and old statutes, as far back as the fourteenth century, denominate them "able-bodied, sturdy and valiant beggars," and prohibited any one of this class begging of the town where he had last resided for three years, as this would diminish the number of impostors by limiting their tale of woe to ears that could know how true or false it was. A statute of Henry VIII whipped the "sturdy and valiant beggar" for the first offense, cut off the tip of the right ear for the second, and for the third transgression he was liable to be indicted for wandering, loitering and idleness, and put to death as an enemy of his country. During the reign of Elizabeth, the penalty was reduced to a long service in the galleys, or banishment on pain of death if they returned. We give these citations from an old statute merely to show how formidable the question of trampdom looked in an early day to all friends of good government.

What should be the attitude of the State or municipal legislation upon this subject, may require the long and patient study of our wisest minds to reply. An old code in a harsher age may whip, maim, burn and banish the vagrant, but our milder and more humane civilization, should be as eager to save the idle and reform the vagabond, as it is to educate the ignorant and reclaim the thief and drunkard.

But one thing is clear, that feeding the able-bodied tramp at the back door of our homes, or preparing free lunches and soup houses for the idle classes of our cities, or giving them money, is no part of a wise and judicious system of benevolence; unless a pestilence or a fire, flood or earthquake creates a temporary demand for that form of beneficence. Idleness and trampdom breed vice and crime, and whoever out of a soft-hearted charity feeds this class helps to foster a greater evil.

It is also clear that it is the first duty of the government to protect the good and industrious citizen from this army of idlers, strolling vagrants, and lazy, dirty loafers who now infest the land, and render home an unsafe place for life, virtue or property. The home in the country is no longer the castle where the mother and children feel safe when alone, but has become a place where the sight of a rough lout along the road, or hanging around the premises, creates a boding fear, and fills the night with terror. He must be fed and lodged, not from a feeling of tender charity, but from the timid apprehension that if turned away he may burn the house, barn or grain stack, or in some other violent way seek revenge for the non-payment of the tax he levies. Now, a proper regard for the social welfare and civilization will love and protect their homes more than it will the personal liberty of the tramp; and, hence, out of regard for the public good, and also for the welfare of the vagabond, will desire some means of promptly putting a stop to his prowling and wandering about the country, or burrowing in the city, and compel him to learn the pursuits and habits of industry. A philanthropy which feeds these swarms of idlers and vagrants, hummers and old sots, and which forgets the sacredness of all the homes in the country and towns and cities, is not a charity worthy of the least respect. It may quote its usual platitudes about casting bread upon the waters, harboring angels in disguise, and the like, but it is merely a form of charity that hatches serpents' eggs, and that may turn into rapine and murder.

Then we owe a duty to the morals of the present and future. Each adult beggar may be training a family in vice. This is especially true of the idle and mendicant classes about our large towns and cities, who often send their children in rags and dirt, with well-practiced lies upon their lips, and the charity which helps to feed these paupers helps to increase the statistics of vice and crime with the advancing population. In Italy and Spain, where the rich and well-to-do have been in the habit of scattering coin among the lazzaroni for centuries, the streets and roads swarm with beings who

never think of doing a day's work. Tramps begot tramps, and out of the realm of trampdom comes a harvest every year of lazy loafers, drunkards, pimps, hawds, hoodlums and criminals.

There can be no doubt that the chief cause of trampdom is laziness. Man seems naturally averse to work. Industry, like learning or a taste for the beautiful, is an acquired virtue. It is a cultivated plant, and not a weed. All savage people are lazy. They will not stir themselves, only to get a little food, and, once gorged, seek sleep and idleness. And hence, as the streams of beggars and tramps flow from the swamps and bogs of indolence, stupor, shiftless habits and lack of ambition, it has been suggested that it might be at least a partial remedy to provide in every city and county, or a group of counties, a farm, and shops for all kinds of work, where the idle could find employment at reasonable wages, and where the tramping vagabond should be compelled to labor for his own support, and perhaps acquire habits of industry. There may be no feasibility in the suggestion, but there can be no doubt about the fact that such beggars and bummers as we have described are public nuisances, and should in some way be removed from society. A century which has brought so much light into the world ought not to be baffled by this problem, and let this evil grow till it curses our land like some of the fairest portions of Europe.

NEGOTIATIONS are now pending for the sale of a group of 11 mines in the Swisshelm mountains, Carlisle county, Arizona, belonging to Adam Clark and J. W. Fleming, of this city. The claims are reported as being extraordinarily rich; the lowest assay yet made from the ore on the dumps, of which there is about 300 tons, runs 64 ounces in silver. The district is well watered and is covered with excellent wood.

A FISH of solid gold, of the value of \$2,500, is reported to have been dug up in Ober-Lausitz, the border land between Saxony and Silesia. Its surface is said to be incised with mythological figures, wrought after archaic Greek patterns.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY C. HANES, State Mineralogist.]

- [CATALOGUE.]
4636. Orthoclase Feldspar (rock spar) mixed with clays in the manufacture of pottery—City Pottery, Trenton, New Jersey. C. L. Peticolas.
 4637. Orthoclase Feldspar (pseudomorph) used in the manufacture of pottery. (See No. 4636.) City Pottery, Trenton, New Jersey. John Rhodes.
 4638. Sagger Clay—City Pottery, Trenton, New Jersey. John Rhodes.
 4639. Cream Pitcher made of New Jersey clays—Mercer Pottery. John Rhodes.
 4640. Cup and Saucer made from New Jersey clays—Mercer Pottery. John Rhodes.
 4641. Cream Pitcher made of New Jersey clays—City Pottery. T. J. John Rhodes.
 4642. Saucer made from New Jersey clays—City Pottery, Trenton, N. J. John Rhodes.
 4643. Vase made from New Jersey clays—City Pottery, Trenton, N. J. John Rhodes.
 4644. A Microscope Slide—Diatoms from Jutland, C. L. Peticolas.
 4645. B. Microscope Slide—Diatoms from Santa Monica, California. (See No. 35 and second report of State Mineralogist, folio 223.) C. L. Peticolas.
 4646. C. Microscope Slide—Diatoms from Richmond, Virginia. C. L. Peticolas.
 4647. D. Microscope Slide—Diatoms from Mediterranean algae. C. L. Peticolas.
 4648. E. Microscope Slide—Diatoms from Philadelphia, Ageria. C. L. Peticolas.
 4649. F. Microscope Slide—Diatoms from Black Moss, Aberdeenshire deposit. C. F. Fehiger.
 4650. G. Microscope Slide—Diatoms from Mexico, 40 miles from San Diego. C. Fehiger.
 4651. H. Microscope Slide—Diatoms from Pike Pond deposit, New Hampshire. C. Fehiger.
 4652. I. Microscope Slide—Diatoms from Moraine deposit. C. Fehiger.
 4653. J. Microscope Slide—Diatoms from deposit used for glass powder, Germany. C. Fehiger.
 4654. K. Microscope Slide—Diatoms from Monterey County, California (see No. 63). C. Fehiger.
 4655. L. Microscope Slide—Diatoms from Farmington. C. Fehiger.
 4656. M. Microscope Slide—Diatoms from Santa Barbara, California (see No. 731). C. Fehiger.
 4657. N. Microscope Slide—Diatoms from Barbadoes. C. Fehiger.
 4658. O. Microscope Slide—Diatoms from Stavanger deposit, Norway. C. Fehiger.
 4659. P. Microscope Slide—Diatoms from Sub-post deposit. C. Fehiger.
 4660. Q. Microscope Slide—Diatoms from Lunenburg deposit. C. Fehiger.
 4661. R. Microscope Slide—Diatoms from San Carlos deposit, California. C. Fehiger.
 4662. S. Microscope Slide—Diatoms from Lapland. C. Fehiger.
 4663. T. Microscope Slide—Diatoms from Nottingham deposit, north side of the river. C. Fehiger.
 4664. U. Microscope Slide—Diatoms from Mountain Mead, Shelburne, New Hampshire. C. Fehiger.
 4665. V. Microscope Slide—Diatoms from Lost Springs deposit, California. C. Fehiger.
 4666. W. Microscope Slide—Diatoms from Sodankala, Finland deposit. C. Fehiger.
 4667. X. Microscope Slide—Diatoms from Stony Ford, Antrim county, Ireland. C. Fehiger.
 4668. Y. Microscope Slide—Diatoms from Ventura County, California. C. Fehiger.
 4669. Z. Microscope Slide—Diatoms from Kongsiga, Norway deposit. C. Fehiger.
 4670. AA. Microscope Slide—(Glauconite) rock from near the Wall Street quicksilver mine, Lake County, California. Melville Attwood.
 4671. BB. Microscope Slide—Rock section of so-called quartzite from Eureka Consolidated mine, Eureka, Nevada. Melville Attwood.
 4672. CC. Microscope Slide—Rock section, serpentine, Polio, S. Francisco, California. Melville Attwood.
 4673. DD. Microscope Slide—Rock section—Black Dyke, footwall of Constock ledge, Gold Hill, Nevada. Melville Attwood.
 4674. GG. Microscope Slide—Rock section, wall rock, Bodie mines, Mono County, California. Melville Attwood.
 4675. HH. Microscope Slide—Rock section, clay porphyry, Mariposa, California. Melville Attwood.

The Patio Process.

(CONTINUED FROM PAGE 187).

25 a ton, making a difference of \$2.58 a ton in favor of the hacienda driven by water power in the way that I have described.

Advantages and Disadvantages.

The only positive advantage of the patio process lies in the cheapness of the plant. Rough stones and hydraulic lime for tanks, washers and tahonas are procurable almost anywhere. Timber for the woodwork is also generally plenty; no elaborate carpentry is needed; and with a rawhide or two for thongs the outfit is complete. In no other country than Mexico would such a process have taken root, and only the richness of the mines and the want of transportation have enabled it to survive even in that most conservative land.

Some of its disadvantages are the constant bother, to say nothing of the expense, in working with mules, and the frequent banding of the ore, quicksilver, and amalgam, which besides being expensive, gives excellent chances for robbery. There is a great waste of materials, and of quicksilver, gold and silver. Large quantities of tailings are produced, which must be concentrated and shipped, with extra expense and with loss of interest on a considerable amount of capital. Last, and very far from least, is the great disadvantage of time; four weeks, at least, are needed under the most favorable circumstances, from the arrival of the ore at the hacienda until the extraction of the silver, and this time may be greatly lengthened, or even doubled, by variations of weather and of temperature. Even the Mexicans are beginning to be alive to these considerations, and it is probable that in a decade or two the patio haciendas now in operation will be memories of the past.

In the consideration of this process I have made no effort to investigate its reactions. Several learned chemists have, I believe, written on this branch of the subject, but I do not know that they ever approached an agreement. I may well be excused from entering into a discussion which has already proved itself so very unprofitable.

Accompanying this paper I give a scheme of the patio process (see engraving), from which the relations of the various products can be readily seen, and also drawings of the apparatus used.

The Mexican pound has 16 ounces, and weighs, according to the tables of the Durango mint, 0.46024634 kilogramme. This is the weight referred to in the preceding paper wherever the word pound occurs; the ton is 2,000 of these pounds. The "marc" used in Mexico as a unit in weighing silver and gold weighs eight ounces, or half a Mexican pound.

INDIA-RUBBER OIL.—Dr. Beckhart, of Spandau, has patented in Germany an india-rubber oil which is intended to serve as a protective against rust. According to the description published in the German technical press, the rough oils obtained in the dry distillation of brown coal, peat, or other bituminous substances, are subjected to further distillation. Thinly rolled india-rubber cut into small strips is saturated with a four-fold quantity of this oil, and is let stand for eight days. This mass, thus composed, is subjected to the action of vulcan oil, or a similar liquid, until a homogeneous, clear substance is formed. If this substance is applied in as thin a layer as possible on a metal surface, it forms, after slow drying, a kind of skin which ensures absolute protection against atmospheric influences. The durability of this covering is said to be most satisfactory. India-rubber oil is also said to be effective in the removal of rust which has already been formed.

The Germania White Lead Works have begun to discharge lead. The works have been operating about two weeks, and the samples of white lead taken from the oxidizing cylinders yesterday were very fair, being much finer than was anticipated for the first manufacture. They expect to produce fine lead for painting from the granulations in the small space of 10 days. Under the old system it required from three to five months to produce good color. The company will begin grinding lead with oil this week and packing in kegs ready for the market. The enterprise has proved a success already in producing a good article at small expense, and we trust will prove a great financial success.

A LARGE body of high grade ore has been struck in the Monitor and Gore, in Taylor District, Nev. Two drifts have been run just inside the boundary lines of each claim and both are in ore, top, sides and bottom. The drifts start from a point common to both, but diverge, one going into the Monitor ground and the other into the Gore. This new strike is well calculated to brace up mining property in Taylor District at a time when it does not stand particularly in need of it. Taylor is one of the few mining districts that is destined to come to the front on its own merits.

A NEW artificial ivory of a pure white color, and very durable, has recently been manufactured by the inventor of celluloid; it is prepared by dissolving shellac in ammonia, mixing the solution with oxide of zinc, driving off ammonia by heating, powdering, and strongly compressing in moulds.

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B. G. McLAIR,

Superintendent Indian Spring Drift Mine.

H. H. BROMLEY,
Dealer in Leonard & Ellis' Celebrated

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Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

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We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

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The Coming Eclipse of the Sun.

Early Preparations Required for Its Observation.

EDITORS PRESS: A total eclipse of the sun will occur May 6th, but will only be visible at the Marquesas Island, and at Tongataboo and Eoa, Pacific ocean. This total eclipse should be of considerable interest to the whole scientific world, as well as amateurs, for the unusual opportunities it may present for the successful determination by scientists of all the interesting phenomena that an eclipse of such long duration can best afford. I believe it has been computed by astronomers that the total phase will occupy about six and one half minutes, which is fully twice as long as the average of total solar eclipses. Of course, the value of photography and analytical observations by the spectroscope, can hardly be over estimated, and in general, affords the chief attractions to the best scientists from every nation. It is well known, also, that every observer has his special work, and however interesting the prospect may be for new discoveries in another branch of phenomena, it is absolutely necessary for such a specialty to be provided for beforehand, that ample justice may be done in the matter; for the limited time at best, that a total solar eclipse affords for the several phases of observations. I shall not attempt any general description of the value of observations of total eclipses of the sun, for the public are perfectly familiar with the subject from scores of illustrated volumes, but the rare opportunity of special observations for an

Intra-Mercurial Planet,

However discouraging it may seem to have proved hitherto, is deserving of the best encouragement, and I would like to suggest that every Government would do well to prepare a fine Vulcan medal, which might, in honor to the memory of Leverrier, who labored so assiduously to determine an orbit for one or more of the suspected Vulcans, be termed

The Leverrier Medal.

It should be, of course, a very handsome and valuable gold piece; but it might be still better for different nations to give different rewards—some works of art of practical value, such as a good working, achromatic telescope, not less than six inches aperture, properly mounted, spectroscopes, and photographic apparatus, etc., of the best make. Each Government, should any present it, upon proof being made of the discovery of an intra-mercurial planet, and the first computer of its orbit, should be entitled to a similar reward or rewards from each country. Any computations that may have assisted in making the discovery should likewise be duly rewarded.

It seems to me to require some stimulating arrangement of the kind to stir up a general interest in the matter. I cannot hope to be an observer myself, but having given considerable attention to the inquiry for several years, and having great faith in Prof. Watson's re-observation at Wyoming, July 29, 1878, I think it very possible that an approximate orbit may now be determined, which way, perhaps, be verified at the forthcoming eclipse, or, if not, still materially aid to the re-discovery May 6th next, and the determination of its period in future. Assuming then, that Prof. Watson, July 29, 1878, saw Vulcan at apparently 2° 9' from superior conjunction, I long ago explained that that distance was equivalent to 11-24 of a revolution, and indicated 1,808 11-24 apparent revolutions from January 1, 1750 to July 29, 1878, each revolution being 25.96825104 days, or 25d. 23h. 14m. 17s., and was the nearest approximation, I believe that could be found. Gaictat's adaptation of the Leverrier formula of the case, which he failed to see, could be applied to the planet being in the superior part of the orbit, and which was roundly called 26 days. Now, then, assuming that period continued to May 6th next, gives us 67 1-11 revolutions, or about 13-24 from the last inferior conjunction, or say about 2° 9' to 3° past the other side of the sun. Early in September last I made some comparisons of an orbit derived from Prof. Balfour Stewart's sun spot theory. The period would approximately be 25.69826 days, taking 67.8 revolutions nearly from July 29, 1878, putting the planet any 3° of the orbit past its first elongation, so apparently at the best position 10° 12' from the sun.

Although the two computations point to those particular positions more particularly, it is, of course, of the utmost importance that the entire range of east and west elongations should be swept by the fieldglass, and very carefully scrutinized, as we have no absolute data to compute the position as required. But again, in the event of the true period being nearly in accordance with Leverrier's 33.0225 sidereal periods, or about 36.3 synodical periods, there would have been just about 48 apparent revolutions since July 29, 1878 by May 6th next, so that the planet would again be very nearly the 2° 9'. Prof. Watson saw it from superior conjunction. Thus, we have some points that may help the matter, and in case of verification of either would be peculiarly interesting.

I will now say a few words about locality. Inconvenience will not be regarded, of course, by those scientists who determine to make the best of the unusual opportunity, and it will certainly be the more to their credit. It is certainly a much shorter and less expensive trip from California than from the eastern States or

Europe. Still some of the best eastern and European astronomers and scientists will doubtless be on hand where they hope to obtain the best observations. The choice lies between the Marquesas about W. longitude 140° 41' and latitude S. 7° 50' to 10°, or possibly Tongataboo, and Eoa, southeasterly about 10 miles, and rather south of the Friendly Isles. Tongataboo is considerably the largest island and lies about 174° to 175° W. longitude and about 21° S. latitude. It is doubtful whether it is quite within the belt of the total eclipse or whether Eoa is more favorably situated. Possibly both may be included if the belt is 2° wide, as may be seen in the *American Nautical Ephemeris*. There are interesting accounts of both islands in the "U. S. Exploring Expeditions," Vol. 23, by Capt. Wilkes, 1840-42. Probably merchants have been much better acquainted with the islands since that time. Eoa is about 30 miles circumference, and rises to 350 feet in height. It was chiefly volcanic, without much space for cultivation, as supposed in 1840, and very few inhabitants, while Tongataboo had a large population then, and has a good harbor, but rather difficult of access. The best illustration I have seen of Tongataboo is in "Capt. Wilson's Voyage, 1796-8," scale, five eighths of an inch to one mile, making a good quarto-size map, showing the island, coral reefs, and channels, etc. The Marquesas are, of course, very much nearer to America, and only about 30° SSE. of the Sandwich Islands. The two most northerly of the islands are apparently well within the total eclipse belt, but, having failed to find a chart of them in detail, I cannot give their names or size of those within the total eclipse belt. Mr. Ellis' "Polynesian Researches, 1853," gives an interesting account of the group. He says the Marquesas form two clusters. The southeastern comprises five islands—Tahuata, Hiraao, Mahotane, La Magdalen and Hood's Island. These were discovered in 1595, but the north cluster not until 1792. This division consists of five islands, also: Nukahira, the largest, Mapan, Trevenian's Island, Huakuka, Hogert Rocks, and Robert's Island. The men are a fine race, but warlike, licentious and fierce, and not cured of cannibalism, but may be improved now.

A. F. GODIARD.

Sacramento, March 6, 1882.

Home Manufactures.

All history will vindicate the statements, that exclusively mining and agricultural countries are usually poor and dependent, that the production of the raw material from the fields, forests or mines is not the productive wealth that builds up towns and cities, of at least the kind that most greatly benefits the trading and wage-receiving classes. It is a kind of wealth which stands in pools, and does not spread out over the whole country and make the wilderness and solitary places glad, and the deserts rejoice and blossom as the rose. It does not thrill and electrify the social, educational and material interests of the country so thoroughly as to cause all parts to pulse with life and health. The reason is obvious. The raw, bulky, heavy material goes abroad at low rates, and returns as the product of skilled labor, at high rates. The difference between the price of the two commodities is the loss sustained by the non-manufacturing producer, and no people can claim to be well on the way to the highest prosperity who are content to be vegetable dealers and marketers, the producers of raw material, wholly dependent upon the capricious and fluctuating prices of the foreign purchasers and manufacturers for the necessities and comforts of life.

We study the future in the light of the past, and what home manufactures have done for other nations and States, we may safely calculate they will do for California. We need only the example of our English ancestors. Though England is first known in history by the efforts of the Phœnician navigators to obtain the products of her mines, and although her pastoral and agricultural wealth chiefly attracted the Roman conquerors, still England never emerged as a first-class power in Europe until she had learned to manufacture her own productions. Then the island became a busy hive of industry and wealth. England exports no raw material; and what is the consequence? The whole land shakes with machinery, and her sea coast is one long counter, where she trades with the world, buying the crude material and selling the refined and putting the difference into her pocket. Home manufacture has largely been the recuperative power of France, Prussia and Holland, after being prostrated by long, devastating wars. These countries have steadily grown rich—have money to loan and invest in great public enterprises—while Russia, whose exports consist chiefly of the raw material, is one of the poorest nations of Europe, considering her extent and resources. Home manufactures made New England, with her thin soil, granite hills, and rough climate, rich and self-reliant; while the sunny South, with a fertile soil, a delicious climate, but exporting all she raised, languished in poverty. But the claim of a new era of prosperity in that fair clime is evidenced by the fact that her capital is beginning to whiz and whirl in her looms and spindles.

We need only study what the mining products, the coal measures, and a system of careful agriculture combined, have done for the political and material prosperity of Great Britain, to learn where the great secret of California's future prosperity lies if duly appreciated.

There is no State in the Union that possesses so many marked advantages for building up a large manufacturing industry. We have wood, coal and petroleum in abundance. The out-door laborer rarely suffers from heat or cold. The ice never pinions the mill wheels, and the path to the shop or factory is never blocked with snow. Then, nearly all the staples, which constitute the same material, can be produced with the greatest ease, and in the largest quantities. The soil and climate are adapted to an almost endless variety. Anything in the line of wool, grain, wool, cotton, silk, California can produce of the best quality, and as cheaply as the most favored country in the world. There is no reason, then, why we may not manufacture, at least four fifths of our present importations, and lay the foundation of an export trade, that will whiten the Pacific with the sails of our commerce.

There is already a great demand for our woolen goods, many mills reporting it impossible to fill their orders, and yet the bulk of the wool crop is still shipped east. Last year, California flour went to Great Britain, Germany, China, Japan, Central America, Australia, British Columbia, Mexico and the Pacific Islands, and everywhere at good profits to the shippers, and yet, the most of our wheat still goes in the sacks to foreign countries. Now, any portion of this raw material which we can manufacture to export, is just so much more added to the wealth and prosperity of the State.

Home manufactures made England the richest and most powerful nation on the globe! Home manufactures made New England the leader of a mighty republic! And home manufactures may make California the commercial empire of the Pacific coast.

DON'T FORGET THE STAMP.—Always take a last look at a letter before posting to see that the stamp is in place. Recently one of our agents in Los Angeles county found a letter containing \$3 for one year's subscription to our paper, held for postage which the writer no doubt thought he had duly stamped, and but for the incidental finding of it by our agent, would of course have supposed we had received the money at the proper time. Let all subscribers when remitting or ordering their paper stopped be sure they duly stamp their letters.

Be Fair.

If there are any more subscribers (who are able to pay) receiving this paper, who have not and do not intend to pay for it (if they can avoid it), they are earnestly requested to notify us by postal card before their indebtedness further increases. We do not wish, and never have intended to send the paper to a single person who does not want it, but, when sent in good faith to a subscriber on our part, we cannot afford to be cheated out of our honest dues, and shall not if we can, by fair and legal means, prevent it. We are ever ready to allow for any real mistake on the part of any one, but we have little confidence in the good faith of any man who will receive the paper month after month with the deliberate intention of not paying for it, when three minutes' writing and a one cent postal card would stop it.

A Cheerful Recommendation.

BENICIA, CAL., February 4, 1883.

Messrs. Dewey & Co., Patent Solicitors:—I am in receipt of my patent, "Improvements in Vehicle Brakes," obtained through your Agency, and would say I am much pleased with thorough and graphic description in specifications and drawings, and can cheerfully recommend you to anyone wishing to obtain favors in your line.—Truly yours, C. R. DUNN.

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Should this paper be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent.

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New processes and methods of mining are described in its weekly issues. New mining machinery and improvements are frequently illustrated and explained in a manner to be of great value to all interested in mining.

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Every public library, mining engineer, metallurgist, mining operator and intelligent mechanic and manufacturer, will find profit by its reading.

Subscription, \$4 a year in advance. Sample copies postpaid, 10 cents.

DEWEY & CO., Publishers.
No. 252 Market St., San Francisco, Cal.

CURIOUS EFFECTS OF LIGHTNING.—Some interesting effects of lightning have been observed by M. Allard at the summit of the Puy de Dome, where, on a circular tower, is an iron mast about 20 feet high, supporting an anemometer of the Robinson type, with four copper cups. There is also a ladder and stand (both made largely of iron), to allow of access to the anemometer for cleaning. Two metallic cables connect the system with the copper plates in the ground. Under these conditions, St. Elmo's fire often appears at the salient points of the mast, stand, etc., and a slight hissing is sometimes heard. All the cups of the anemometer show numerous signs of fusion by lightning, and only in their upper half; their connecting iron circle has also been fused in some places. Wherever such fusion has occurred, the metal has been raised like a small volcanic cone in the center of a crater. Some exterior attractive force seems to have raised the melted substance. M. Allard proposes to study the phenomenon more closely.

DETECTING COPPER IN FOOD.—It is well known that unscrupulous vendors do occasionally employ salts of copper to give a fine green color to pickles, but we incline to the opinion that this dangerous form of food adulteration is far less commonly practiced than is generally believed. To detect the presence of copper, we need only take one of the suspected pickles, cut it into pieces, then add some ammonia. If copper is present, even in very slight traces, the addition of a few drops of ammonia will instantly develop a beautiful deep blue coloration.

CURE FOR IVY POISONING.—Bathe the parts affected with sweet spirits of nitre. If the blisters be broken, so as to allow the nitre to penetrate the cuticle, more than a single application is rarely necessary; and even where it is applied to the surface of the skin three or four times a day, there is rarely a trace of poison left the next morning.

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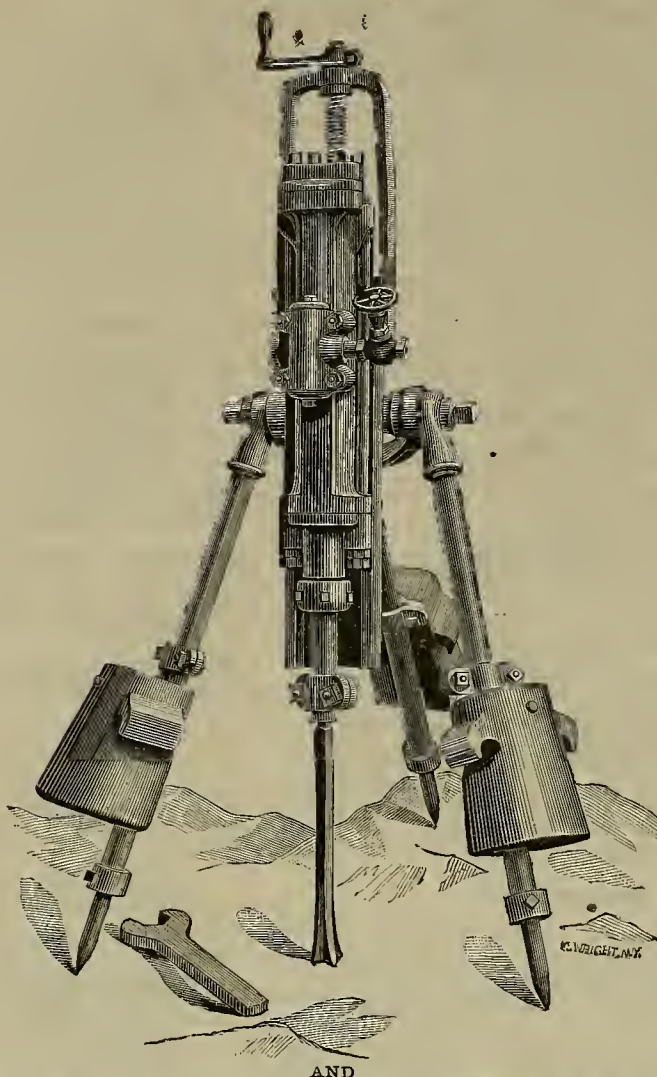
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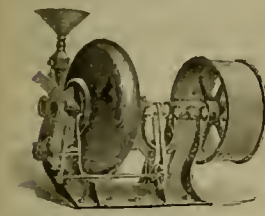
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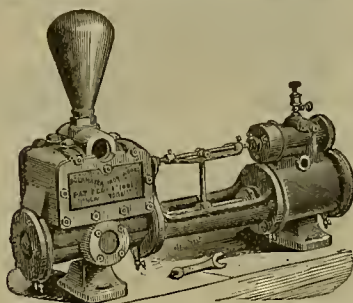
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

WEEK ENDING MARCH 6, 1883.

273,344.—AUTOMATIC CAR BRAKE—Buckley & Jackson, S. F.
 273,345.—CAR BRAKE—Buckley & Jackson, S. F.
 273,350.—AUTOMATIC GOVERNOR AND CUT OFF—H. H. Duffin, S. F.
 273,407.—ORE AND ROCK CRUSHER—M. B. Dodge, S. F.
 273,478.—ROCK CRUSHER—M. B. Dodge, S. F.
 273,368.—PENCIL CLASP—John F. Foster, S. F.
 273,353.—RAIL STRAIGHTENING MACHINE—Peter Fricchette, Sheridan, Cal.
 273,272.—LANTERN—John Gillig, Virginia City, Nev.
 273,355.—WINDOW SASH AND FRAME—Jacob Gruninger, S. F.
 273,359.—WASHING MACHINE—Wm. A. Hedger, Wheatland, Cal.
 273,556.—FIRE-PROOF STRUCTURE—Samuel Liddle, Hamilton, Nev.
 273,292.—GANG PLOW—Geo. Lissenden, Stockton, Cal.
 273,330.—THIMBLE AND THREAD CUTTER—W. J. Miller, Alameda, Cal.
 273,316.—PLOW—John O. Rollins, Chico, Cal.
 273,305.—KITCHEN CABINET—John W. Ross, Santa Clara, Cal.
 273,397.—HYDRAULIC MINING MACHINE—Jay E. Russell, S. F.
 273,407.—BALING PRESS—Henry Tyack, Grass Valley, Cal.
 273,414.—CASTANET—O. F. Westphal, S. F.
 273,333.—HAND LOOM—Andrew Wright, Rhonerville, Cal.
 273,391.—GRAIN THRASHER AND CLEANER—Rader & Malsbury, Hollister, Cal.
 273,642.—WINDMILL—Jas. E. Toombs, Tyner, U. T.
 NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

GRAIN THRASHER AND CLEANER.—David H. Rader, of Gilroy, and Job Malsbury, of Hollister, Cal. Dated March 6, 1883. No. 273,391. This invention relates to certain improvements in machinery for cleaning and thrashing grain. Its object is to greatly increase the cleaning capacity, and to this end the invention consists in novel features of construction and combination and arrangement of parts, somewhat difficult to describe without the aid of engravings, but quite ingeniously constructed. The inventors call this the "Golden Monitor," and claim that it has double the capacity of any other grain thrasher and cleaner. The mechanism is reduced to the fewest parts, is of the simplest description, and is very easily driven.

GANG PLOW.—George Lissenden, Stockton, Cal. Dated March 6, 1883. No. 273,292. This invention relates to certain improvements in sulky or gang-plows; and it consists of a novel mechanism by which the plow-frame is connected with and supported upon the wheel-axes of a draft-pole and its connection with the plow, and of a lever, connecting-arms, and standards, whereby the plow may be raised out of the ground or let down to the proper depth. It also consists in means for connecting the pole with the frame of the plows, and an adjusting mechanism for its rear end, which is so connected as to travel forward and back with the pole with relation to the frame, together with the means for supporting the whole upon the wheels, by which the plows will hold their position in the land and make an equal cut in land of variable quality and hardness.

CAR BRAKES.—Edward M. Buckley and Andrew Jackson, S. F., Cal. Dated March 6, 1883. No. 273,345. This invention relates to certain new and useful improvements in automatic car brakes, and consists in an intermediate lever or bar, through which power is transmitted from the longitudinally moving draw-head, acting through a certain pivoted lever, to the braking apparatus. It also consists in a novel means for throwing these parts in and out of engagement when desired. The general object of the invention is to make the entire train brake itself through the draw-heads of each car; but the particular object of the construction here patented is to simplify the mechanism, whereby it may be furnished at small cost, and produce as effective results.

WASHING MACHINE.—William A. Hedger, Wheatland, Cal. Dated March 6, 1883. No. 273,359. This invention relates to the class of washing machines, and more particularly to those in which a hemispherical rubber is caused to oscillate in a concave board. It consists in a novel means for elevating and depressing the rubber to allow the insertion of the clothes and to press them down to their places. The object is to overcome that difficulty which is known to exist in introducing the clothes under a rubber which operates in a confined space and remains close to its board; and, further, to provide a means for easily adjusting the position of the rubber after the clothes are inserted.

BALING PRESS.—Henry Tyack, of Grass Valley, Cal. No. 273,407. Dated March 6, 1883. This invention relates to certain im-

provements in presses for baling hay, cotton, wool, rags, hops, hair, etc. These improvements relate to the entire press and all its parts, and include principally the construction of the body or frame, the follower and the means for operating it, the cover or lid and the means for adjusting and opening it, the front or discharge door and the means for mounting it, the side door, and other details. The object of the invention is to provide an effective baling-press, and each of the several improvements made has this general result in view.

WINDOW SASH AND FRAME.—Jacob Gruninger, S. F., Cal. Dated March 6, 1883. No. 273,355. This invention consists in a means for hinging the window-sashes in their frames, whereby, by the removal of the inside beads and a parting strip, both sashes may be swung to the inside. The object is to provide easy access to the outer surface of the windows, for the purpose of cleaning. When the sashes are fast in their frames, there is much danger in getting at the outside to wash the glass, and many accidents have occurred; but by swinging the sashes into the room, the glass may be washed on the outside with safety and convenience.

TWO-WHEELED VEHICLE.—Benjamin P. Whitney, Potter Valley, Cal. No. 272,177. Dated Feb. 13, 1883. This invention relates to certain improvements in two-wheeled vehicles, and these improvements consist in a means for supporting and hinging the seats at one side to the shaft, and latching it at the other, in certain draft irons or rods attached to the axle and to the foot board, and in breaking the hub of the wheel, and in a means therefor. The object of this invention is to furnish an easy entrance to and exit from the vehicle, and an easy-riding seat to transfer a portion of the draft from the side springs to the axle when a sudden jerk occurs.

AUTOMATIC CAR BRAKE.—Edward M. Buckley and Andrew Jackson, S. F., Cal. Dated March 6th, 1883. No. 273,344. This invention relates to a new and useful automatic car brake, and it consists in a novel combination of devices for connecting the spring drawhead with the braking apparatus, whereby the motion of the former, when it impinges against the opposite drawhead, is transmitted to the brakes to apply them to the wheels. The object is to make each car brake itself by its own momentum, to make the force of the brakes depend upon the momentum, so that the braking operation shall be entirely automatic, and to provide a simple, cheap and effective device for the purpose.

MACHINE FOR STRAIGHTENING OR BENDING RAILS.—Peter Fricchette, Sheridan, Cal. Dated March 6, 1883. No. 273,353. This invention relates to a new and useful machine for straightening and bending the rails of a railroad, and it consists in the details of construction and combination of devices, in combination with a frame having a central longitudinal passage, to which are directed the pressure ends of a number of screw-jacks extending through the top, bottom and sides of the frame.

TRACE-HOOK.—Calvin P. Wakefield, Cressey, Cal. No. 272,175. Dated Feb. 13, 1883. This invention relates to a new and useful improvement in trace-hooks, and it consists in a metal hook riveted to the trace and provided with a peculiar overlapping guard. The object of this invention is to prevent the other parts of the harness from getting into the hook and becoming entangled.

CAMERA SHUTTER.—David S. Boydston, Volcano, Cal. No. 272,117. Dated Feb. 13, 1883. This invention consists in a two-part shutter, mounted in suitable guides behind the aperture, and moving apart to open the camera, or together to close it, under the influence of springs peculiarly arranged and secured to the shutter. The object of this invention is to provide an easy means of opening and closing the camera with great rapidity, whereby difficult and instantaneous photography is assured.

COMBINED THIMBLE AND THREAD-CUTTER.—Washington J. Miller, Alameda, Cal. Dated March 6, 1883. No. 273,330. This invention relates to an improvement in a combined thimble and thread-cutter, and it consists mainly in the peculiar means by which the knife is secured to the thimble, so that it may be reversed and used as a seam ripper, and also in a channeled plate, which is fixed to the edge of the thimble, so that the edge of the knife is within the channel, and below the level of its sides.

LANTERN.—John Gillig, Virginia City, Nev. Dated March 6, 1883. No. 273,272. This invention relates to certain improvements in lanterns, and is more especially applicable to miners' lanterns, having a conical projecting top. It consists of bent lugs or hooks hinged to the lower part of the lantern frame, and capable of being turned inward to allow the glass to slide upward from the bottom into its grooves or guides, after which the hooks may be turned outward and serve to support the glass which is let down upon them.

MINES IN PRESCOTT, A. T., that were worthless two years ago, on account of being low grade, are now worth from \$10,000 to \$100,000 each.

News in Brief.

COMMANDER CHEYNE, who is in Montreal, says that he has not abandoned his proposed balloon expedition to the North Pole. Lieutenant Schwatka has offered to join him.

JOE HOLLIDAY denies that he is about to sell out and leave Portland. He says he is well satisfied with this city and its future, and that if Henry Villard or any one else wants to buy him out, it will take not less than \$3,000,000.

THE COMMISSIONER of the General Land Office has sent for delivery to the party legally entitled thereto, a patent for Rancho los Vallecitos de San Marinos, Lorenzo Soto, confirmee. This grant contains 8,777.29 acres, and is situated in San Diego county.

THE steel and iron workers of Pennsylvania intend to propose a plan whereby wages will be increased about 15%. A strike in this case is said to be not improbable.

A BOSTON dispatch says the entire subscription of the Mexican Central railway securities, under circular No. 4, amounted at the close to \$7,229,500, or \$1,197,000 more than asked for.

THE farmers in Virginia complain very much of petty larceny since the whipping-post was abolished.

GOVERNOR CLEVELAND has returned to the Assembly the bill reducing the rate for the New York elevated railroads, with a message giving his reasons therefor.

A SWEEPING decision against bucket shops has been delivered in the United States Court of New York State.

INTELLIGENCE from France states that the emente there is due to the fact that 60,000 persons are out of employment. A Times correspondent at Paris says that for the past few days many foreigners have kept away from that city on account of its unsettled condition. There are now at Rome many Americans who were about to start for Paris when the demonstration occurred.

AT OTTAWA, Sunday evening, a crowd of excited people collected in front of Professor Wiggins' residence and began to clamor for his appearance. As the doors and windows remained firmly closed, cries of "Fraud" and "Humbler" filled the air, and an attack upon his house was only averted by the opportune arrival of the police, who quelled the impending disturbance, and assured the mob that Wiggins was not at home.

ARCHAEOLOGICAL DISCOVERY IN ASIA MINOR. A discovery has been made lately by a Bavarian archaeologist, Herr Sester, at the point where the Euphrates bursts through the Taurus range. Here, in a wild, romantic district lying between Madatiah and Sanias, he found a line of megalithic monuments, averaging between 55 and 60 feet in height, and bearing inscriptions. They are in a remarkable state of preservation, and Herr Sester has no doubt that they formed a part of some great national sanctuary, dating back some 3,000 years or more. There was formerly at this place a necropolis of old Cominagene kings, so that it seems reasonable to attribute these colossal monuments to this ancient people, the hereditary foes of the Assyrians. Very little is known about them. The classical writers allude to them only in casual passages, and the arrow-headed inscriptions, although mentioning them very often, have hitherto yielded scanty information.

RICH rock has been struck at the Muck & Eckart mine, on Else creek, near Volcano. The shaft is down 150 feet, and a drift has been run on that lead north 100 feet. Here a four-foot ledge was found, the chimney being extensive. Ore is being hauled to the Gillick mill for crushing. Frank Keenan is foreman.—*Amador Sentinel*.

THE GOOD TIME COMING.—"The day is coming," says an exchange, "when a letter will go anywhere within the United States for one cent, a dispatch for ten, and a man for a cent a mile."

THE Santa Rita Copper & Iron Company, N. M., are working a large force of men on their mine and mill day and night, and are steadily shipping copper.

Successful Patent Solicitors

As Dewey & Co. have been in the patent soliciting business on this coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That is this understood and appreciated is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

Look for Your Subscription Credit.

Subscribers on paying for this paper should look at the date of the printed labels on their papers, and if the same is not credited, in due time, up to the date paid to, be sure to write us without delay. If an agent or clerk receiving the money should inadvertently or intentionally omit credit, it is important to the subscriber and ourselves that we be informed of it IMMEDIATELY, that we may act accordingly. Subscribers will please notify us of all errors which they may notice of any kind on our mail list. Be sure to write us if the paper comes after you wish it discontinued.

Our Agents

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.
 G. W. McGraw—Santa Clara county.
 M. P. Owen—Santa Cruz county.
 J. W. A. Wright—Merced, Tulare and Kern counties.
 JARM C. Hoag—California.
 B. W. Crowl—Arizona Territory.
 L. Walker—San Joaquin county.
 N. H. Harp—Plumas county.
 A. C. Knox—Napa county.
 M. H. Joseph—Eureka, Nev.
 G. R. McDowell—Sonoma county.
 F. W. Stratton—Calaveras and El Dorado counties.
 I. M. Leiby—Los Angeles and San Bernardino Counties.

CHEAP ORE PULVERIZER.—There is for sale in this city, as will be seen by our advertising columns, a second-hand Rutherford Pulverizer, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct or if the paper should ever come beyond the time desired, be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omission of agents.

The Lemmon Herbarium.

This Herbarium has been removed from the Bake House to a permanent place at 1205 Franklin St., near Fourteenth St., Oakland, one square east of the Post Office, where plants of the Pacific Coast, including Arizona, may be determined on application, and instruction given in botany during the winter. Sets or single specimens of the rare and new ferns of the Pacific Coast for sale.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, March 15, 1883.

ANTIMONY.—		
Per pound.....	—	@ 15
IRON.....		
American, Pig, soft, ton.....	—	@ 31 00
Scotch, Pig, ton.....	—	@ 29 00
American White Pig, ton.....	—	@ 30 00
Oregon Pig, ton.....	—	@ 30 00
Clippings, Nos. 1 to 4.....	—	@ —
Refined Bar.....	—	@ 4
Horse Shoes, keg.....	—	@ 5 50
Nail Rod.....	—	@ 7 75
Norway, according to thickness.....	—	@ 6 70
STEEL.....		
English Cast, lb.....	16	@ 25
Black Diamond, ordinary sizes.....	15	@ 14
Black Diamond, extra sizes.....	15	@ 16
Machinery.....	12	@ 14
COPPER.....		
Ingots.....	—	@ 22
Sheet.....	37	@ 31
Sneaking, Tinned 14x18.....	—	@ 34
Nails.....	—	@ —
Bolt.....	—	@ 33
Old.....	—	@ 8
Bar.....	—	@ —
Cement, 100 lbs.....	—	@ 15 1/2
LEAD.....		
Pig.....	4 1/2	@ 54
Bar.....	—	@ 6
Pipe.....	—	@ 8
Sheet.....	—	@ 9
Shot, per bag, 100 on 500 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 30
Pack.....	—	@ 2 50
Chilled.....	—	@ 2 50
TIN PLATES.....		
Charcoal.....	7 25	@ 7 50
Oke.....	6 25	@ 6 40
Banca Tin.....	—	@ 25 10
Australian.....	—	@ 25 00
J. C. Charcoal Roofing 1x20.....	—	@ 6 90
ZINC.....		
By the Cask.....	—	@ 9
Zinc, sheet 7x3 ft., 7 to 10 lb, less the cask.....	—	@ 10
NAILS.....		
Assorted Sizes.....	4 00	@ 4 75
QUICKSILVER.....		
By the flask.....	—	@ 37
Flasks, new.....	—	@ 1 55
Flasks, old.....	—	@ 1 20

DEWEY & CO.

SCIENTIFIC PRESS

AMERICAN AND FOREIGN

PATENT AGENCY,



NEW OFFICES, 1882:

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 SAN FRANCISCO.

Branch Offices in all Foreign Countries.

CIRCULARS OF INFORMATION FOR INVENTORS SENT FREE ON APPLICATION.

Geo. H. Strong, W. B. Ewer, A. T. Dewey

Retail Groceries, Etc.

WEDNESDAY M. Mar. 14, 1883.		
Butter, California	24 @ 25	Yeast Powder, doz. 1.50 @ 2.00
Choice, B.	17 @ 25	Corn Oysters, doz. 2.00 @ 3.00
Cheese	25 @ 30	Syrup, 5 lb. 1.00 @ 1.10
Eastern	18 @ 25	Dried Apples, B. 10 @ 15
Lard, Cal.	20 @ 25	Ger. Prunes 12 1/2 @ 15
Flour, ex. m. bbl. 8	00 @ 25	Flgs. Cal. 9 @ 10
Corn Meal, B.	2 1/2 @ 3	Peaches 15 @ 25
Sugar, wh. crushed	12 @ 13	Ola. Kerosene 50 @ 60
Light Brown	8 @ 9	Wines, Old Port. 3 50 @ 65 00
Coffee, Green	23 @ 35	French Claret. 1 00 @ 1 50
Tea, Fine Black	50 @ 60	Cal. doz bot. 2 00 @ 2 50
Finest Japan	55 @ 60	Whisky, O. K. gal 3 50 @ 4 50
Candles, Adm'ns.	15 @ 25	French Brandy. 4 00 @ 5 00
Soap, Cal.	7 @ 10	

Lumber.

WEDNESDAY M. Mar. 11, 1883.		
Redwood.	Shingles,	@ 2 50
CARBOYS.	Posts, each,	15 @ - 17 1/2
Rough,	Pine.	
8 ft. faced,	CARBOYS.	
8 ft. and etc.	Rough,	@ 18 00
RETAIL.	Surfaced,	22 00 @ 23 00
Merchantable,	RETAIL.	
Surfaced, No. 1,	Rough,	@ 22 50
Surfaced, No. 2,	Flooring,	32 50 @ 35 00
Surfaced, No. 3,	Pickets, rough,	@ 20 00
do, fancy,	Floor and step,	35 00 @ 37 50
do, square,	Laths,	@ 3 75

Pacific Coast Weather for the Week.

[Furnished for publication in the Press by NELSON GOROM, Sergt. Signal Service Corps, U. S. A.]

The following is a summary of the rainfall for each day of the week ending 11:58 A.M. Wednesday, Mar. 14 for the stations named:

Date.	Thurs.	Fri.	Sat.	Sun.	Tue.	Wed.	Total
Olympia.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Portland.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rosoburg.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cape Mendocino.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red Bluff.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sacram'to.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
San Francisco.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Visalia.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Los Angeles.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
San Diego.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Winnemucca.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pioche.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Salt Lake.	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending Mar. 13, 1883.									
HIGHEST AND LOWEST BAROMETER.									
Feb. 23	Mar. 1	Mar. 2	Mar. 3	Mar. 4	Mar. 5	Mar. 6			
30.226	30.134	30.132	30.125	30.104	30.129	30.075			
30.153	30.117	30.103	30.016	30.022	30.026	30.011			
MAXIMUM AND MINIMUM THERMOMETER.									
63.5	71.5	73.5	73.5	63	58	60.5			
50	50	55	54.5	51	48	47.5			
MEAN DAILY HUMIDITY.									
68.7	64.7	51.7	55.0	83.0	87.3	87.3			
PREVAILING WIND.									
NW	NW	NW	NW	W	SW	SW			
WIND—MILES TRAVELED.									
108	108	153	152	213	173	154			
STATE OF WEATHER.									
Clear.	Clear.	Clear.	Clear.	Fair.	Fair.	Fair.			
RAINFALL IN TWENTY-FOUR HOURS.									
.00	.00	.00	.00	.00	.00	.00			
Total rain during the season from July 1, 1882, 12.07 inches.									

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, Mar. 14, 3 P. M.

SILVER.	
GOLD BARS, 890 @ 910.	SILVER BARS, 10 @ 18 3/4 cent d's count.
EXCHANGE on New York, 30 premium; London, 49 @ 49 1/2; Paris, 5.13 francs @ dollar; Mexican dollars, 57 @ 68 1/2; New York 14 cent cent. 120	

General Merchandise.

WHOLESALE.

CANNELS.		WEDNESDAY M. Mar. 14, 1883.	
Crystal Wax,	15 @ 17	Cement, Rosen.	
gearic Acid,	@ 14	Portland,	1 75 @ 2 00
Eagle,	@ 12	Portland,	3 75 @ 4 00
CANNED FOODS.			
Assorted Pic Fruits.		Assorted sizes, keg 3 75 @ 4 00	
2 1/2 lb. cans,	25	Pacific Glue Co's	
Table do,	3 50 @	Neatfoot, No.1.1 00 @ 1 00	
Jams and Jellies	75 @	Castor, No. 1.	@ 1 00
Pickles, 1/2 gal.	25 @	do, No. 2.	@ 95
Sardines, 1/2 box,	1 00 @	Baker's A. A.	@ 95
Hf Boxes,	2 50 @ 1 90	Oliva, Plagnoli's 5 25 @ 5 75	
Merry, Pauli & Co's		Possel,	75 @ 65
Preserved Beef		Palm, B.	9 @ 60
2 lb. doz,	55 @ 63	Linsell, Raw, bbl	80 @ 60
do 4 lb doz,	50 @ 60	Bolled,	@ 65
Preserved Mutton		Cocoanut,	80 @
2 lb. doz,	35 @ 50	China nut, ca.	68 @ 61
do Tongue,	5 75 @ 6 00	Sperm,	60 @ 60
Preserved Ham.		Coast Whales,	35 @
2 lb. doz,	50 @ 55 60	Polar,	@ 60
Deviled Ham, 1 lb.		Lard,	@ 60
doz,	3 00 @ 3 50	Petroleum (110°), ..	18 @ 22
do Ham 1 lb doz 2 50 @		Petroleum (120°), ..	28 @ 30
Boneless Pig Feet		PAINTS.	
3 lbs,	3 50 @ 3 75	Pure White Lead, ..	7 @ 8
2 lb,	2 75 @	Whiting,	14 @
Spiced Pillets 2 lbs 50 @		Putty,	4 @ 10
Head Cheese 3 lbs 50 @		Chalk,	1 @ 10
COAL-Jobbing.			
Australian, ton,	@ 8 50	Parts White,	2 @
Coco Bay,	@ 7 00	Ochre,	3 @
Bellingham Bay		Venetian Red,	3 @
do,	@ 7 00	Averil mixed Paint	
Cumberland,	@ 13 00	White & Tints, 2 00 @ 2 00	
Mt. Diablo,		Green, Blue and	
Lehigh,		Ch Yellow, 3 00 @ 3 50	
Liverpool,		Light Red, 3 00 @ 3 50	
West Hartley,	@ 10 00	Metallic Roof, 1 30 @ 1 50	
Scotch,	@ 9 00	RICE.	
Scranton,	@	China Mixed, B., ..	4 1/2 @ 5
Vancouver Id.,	@	Hawallah,	4 1/2 @ 5
Wellington,	@ 10 00	SALT.	
Charcoal, sack,	@	Cal. Bay, ton,	14 00 @ 22 00
Coke, hush,	@	Common,	6 50 @ 14 00
COFFEE.			
Sandwich Id. lb.,	12 @ 14	Carmen Id.,	14 00 @ 22 00
Costa Rica,	12 @ 14	Liverpool fine,	14 00 @ 20 00
Guatemala,	12 @ 14	SOAP.	
Java,	18 @ 20	Castle, lb.,	9 @ 10
Manilla,	15 @	Common brands, ..	4 1/2 @ 6
Ground, in c,	22 1/2	Fancy Brands,	7 @ 8
FISH.			
Sac'to Dry Cod,	@ 6	Cloves, lb.,	37 1/2 @ 40
do in cases,	@ 7	Cassia,	19 @ 20
Eastern Cod,	7 @ 7 1/2	Nutmegs,	85 @ 90
Salmon, bbl.,	7 00 @ 7 50	Pepper Grain,	15 @ 18
Hf bbl.,	3 50 @ 4 00	Pimento,	16 @ 17
1 lb cans,	1 12 @ 1 22 1/2	Mustard, Cal. B.	
Pk'd Cod, bbl.,	@	Glass,	@ 25
Hf bbl.,	@	SUGAR, ETC.	
Mackerel, No. 1		Cal. Cube lb.,	@ 11 1/2
Hf bbl.,	8 50 @ 9 00	Powdered,	@ 11 1/2
In Kits,	1 70 @ 1 80	Fine Crushed,	@ 11 1/2
Ex Mess kits 3 00 @ 3 25		Granulated,	@ 11 1/2
Picked Herring,	75 @ 2 00	Golden C,	@ 9 1/2
best,	75 @ 2 00	Cal Syrup, keg,	65 @
Boston Smoke		Hawallah Molasses	25 @ 30
Herring,	65 @	TEA.	
LIME, ETC.			
Plaster, Colden		Young Hyson,	40 @ 65
Gate Mills,	3 00 @ 3 25	Moyne, etc.,	
Land Plaster,		Country pk'd Op-	
ton,	10 00 @ 12 50	powder & Im-	
Lime, Santa Cruz		perial,	35 @ 75
bbl.,	1 25 @ 1 50	Hyson,	30 @ 35
		Foo-Chow G.,	27 1/2 @ 32
		Japan, medium, ..	35 @ 37

Leather.

WHOLESALE.]

WEDNESDAY, M., Mar. 14, 1883.

Sole Leather, heavy, lb.,	30 @ 32
Light,	28 @ 30
Jodot, 8 to 10 Kil, doz,	38 00 @ 46 00
11 to 13 Kil,	50 00 @ 60 00
14 to 16 Kil,	65 00 @ 72 00
Second Choice, 11 to 16 Kil,	40 00 @ 55 00
Simon, Ulmo, Females, 12 to 13 Kil,	52 00 @ 60 00
14 to 15 Kil,	60 00 @ 64 00
16 to 17 Kil,	65 00 @ 68 00
Simon, 18 Kil,	@ 65 70
24 Kil,	@ 65 70
Kips, French lb.,	85 @ 1 20
Cal. doz,	55 @ 60 00
French Sheep, all colors,	12 00 @ 15 00
Eastern Cal,	1 00 @ 1 25
Sheep Roans for Topping, all colors, doz,	8 00 @ 10 00
For Hinnings,	6 50 @ 10 00
Cal. Russet Sheep Linings,	3 0 @ 5 50
Boot Legs, French Calif, pair,	@ 4 50
Feat 'odot Calif,	4 75 @ 5 00
Leather, Harness, lb.,	35 @ 40
Far Bridle, doz,	45 00 @ 65 00
Skirting, lb.,	33 @ 37
Wet, doz,	30 00 @ 35 00
Hf ft,	17 @ 20
Wax Side,	19 @ 20

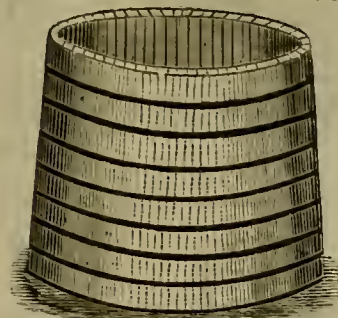
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Extra Inducements will be offered for a few active canvassers who will give their whole attention (for a while at least) to our business. Apply soon, or address this office, giving address, age, experience and reference.

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Over 700 of our well-known Water Tanks put in service last year. These tanks are made by machinery, from the best of materials, and shipped to all parts of the country. Each piece numbered. No skill required in setting up.

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\$3.85



This cut represents a No. 1 CALF SKIN SHOE, made in GAITER or LACE-up sizes, which we are manufacturing with a view to meeting the wants of a large class of people who must have the best shoe for the least money. It is guaranteed as to STYLE, FINISH and QUALITY, and will compare favorably with any \$5.00 shoe in the market. In order to introduce our goods, we will send FREE to any address for the LOW sum of \$3.85 a pair, thereby saving to the consumer the large profits of the jobber and retailer. TRY ONE PAIR AND BE CONVINCED.

F. H. WILSON, 232 West Baltimore St., Baltimore, Md.

Remit by Registered Letter or Money Order.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill & Mining Company.

San Francisco, March 10, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 70, of fifty cents (50c.) per share, was declared, payable on Thursday, March 15, 1883. Transfer books closed on Monday, March 12, 1883, at 3 o'clock p. m.

WM. WILLIS, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

NOTICE OF THE APPLICATION

—OF THE—

South Comstock Gold & Silver Mining Co.

For Dissolution and Disincorporation.

Notice is hereby given that the South Comstock Gold and Silver Mining Company has this day filed with the Clerk of the Superior Court, of the City and County of San Francisco, an application for Dissolution and Disincorporation, and all persons desiring to file objections to such application are hereby notified to file such objections within thirty days after the first publication of this Notice.

March 8, 1883. WILLIAM T. SEENGN, Clerk.
Date of first publication, March 16, 1883. C. Z. SOULE, Deputy Clerk.
WHITTEMORE & McKEE, Attorneys for Petitioners.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE

Kentuck Mining Company.

San Francisco, March 3, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 35, of Ten Cents (10c) per share, was declared, payable on MONDAY, March 19, 1883. Transfer books closed on Tuesday, March 13, 1883, at 3 o'clock p. m.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine Street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, March 1, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 52, of Twenty-five Cents (25c) per share, was declared, payable on MONDAY, March 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WM. WILLIS, Secretary.

OFFICE—Room No. 29 Nevada Block, No. 309 Montgomery street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Navajo Mining Company.

San Francisco, March 2, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 7, of Twenty-five Cents (25c) per share, was declared, payable on TUESDAY, March 13, 1883. Transfer books closed on Wednesday, March 7, 1883, at 3 o'clock p. m.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company

San Francisco, March 12, 1883

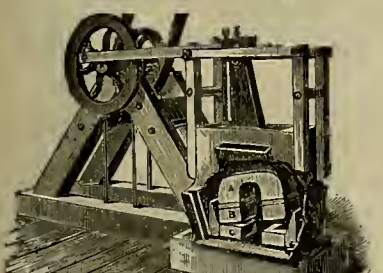
At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 39) of Twenty-five Cents (25c.) per share was declared, payable on THURSDAY, March 15, 1883, at the office of the Company, Room 19, No. 328 Montgomery Street, San Francisco, Cal. Transfer Books will close March 9, 1883, at 12 m.

JOSEPH NASH, Secretary.

Cash in Advance.

Our terms are cash in advance for this paper. NEW NAMES will not be entered on our printed list until payment is made. Feb. 1, 1883.

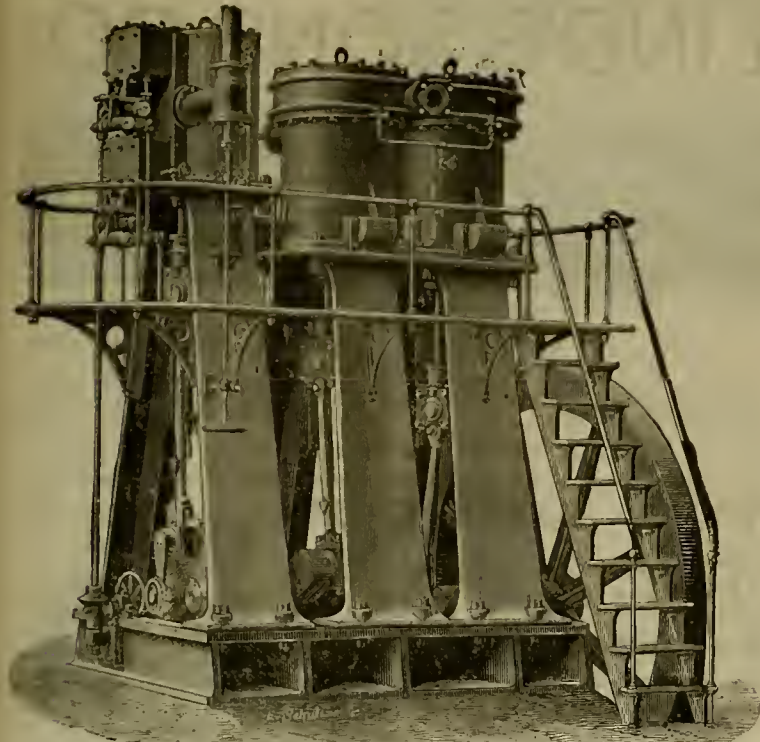
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Oscillating Stamp Mill.

It has no Stems, Cams, or Tappets, and adjusts itself to the wear of the Shoes and Dies.
For simplicity, economy, durability and effective working, it exceeds anything ever presented to the public, and will do the work of two stamps with one-fourth the power. Awarded First Premium and Medal at Mechanics' Fair, S. F., 1880.

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NO. 7 IMPROVED AIR COMPRESSOR.

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Absoluts certainty in the action of ths valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air sntirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

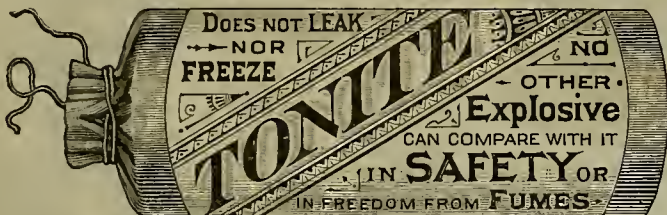
Power applied to the hest advantage. Access obtainable to all the valves by removing air chest covers. Entiro absence of springs or friction to open or shut the valves. No valvs stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

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It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

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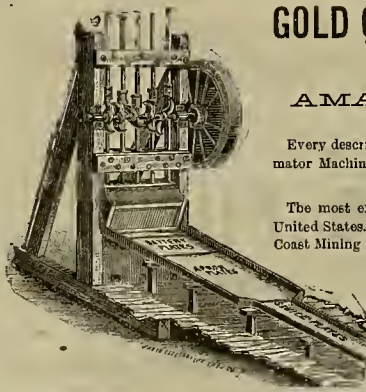
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Of Every Description.

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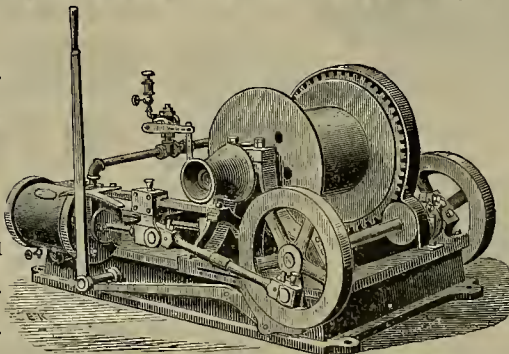
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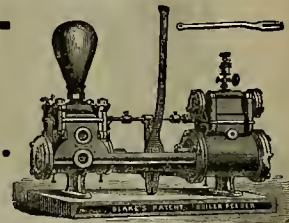
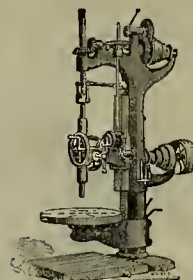
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D. J. STAPLES, President.

ALPHEUS BULL, Vice-President.

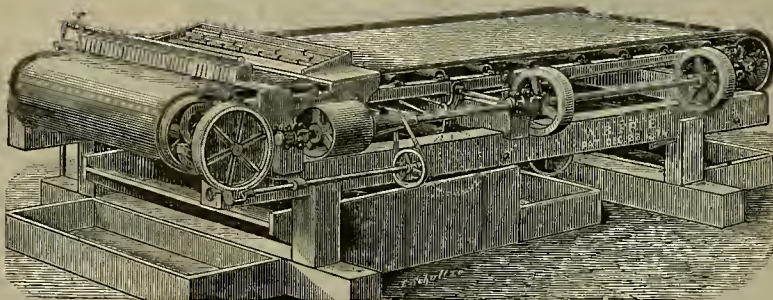
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E. W. CARPENTER, Asst. Secretary.

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Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal.

A machine can be seen in working order, and ready to make tests, at the office of Hinkley, Spiers & Hayes, 290 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

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Nov. 6, 1882.

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Eagle Safety Fuse Co.'s SINGLE, DOUBLE and TRIPLE TAPE FUSE. ALSO CEMENT No. 1 and No. 2, WATER-PROOF and SUBMARINE. Also sell Foy, Bickford & Co.'s and California Fuse Works' Brands. NOBEL'S GIANT CAPS SINGLE, DOUBLE and TRIPLE FORCE.

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15 Cts. per lb.

About 1,000 lbs. of Scotch brevier type used on this paper previous to Jan. 13th, 1883, will be sold in lots of 100 lbs., or more, for 15 cents per lb., and cost of boxing and shipping, if applied for soon. Apply to Dewey & Co., Publishers, No. 252 Market St., S. F.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MARCH 24, 1883.

VOLUME XLVI
Number 12.

The Eureka Planer and Smoother.

The engraving on this page shows the "Eureka" surface planing machine, which has been improved and perfected as experience and practical use by experts have suggested, until, for general planing, requiring stiffness, durability, and speed in changing from one side to another, it is claimed to surpass all others at the price in the market. The machine weighs heavily, and it is really a big planer in a small way. Nothing will illustrate the solidity better than to say it will take a fine finishing cut, doing the very smoothest work; a few turns of the wheel lowers the bed, and a cut five eighths deep on hard wood can be taken. There are two sizes made, 18½ inches wide and 24½ inches wide, and they will work in either hard or soft wood.

The design for frame is best adapted for strength and strain, and is cast all in one piece. The bed being also cast in one piece, and the way it is dovetailed into the frame makes it a very stiff machine for all kinds of hard and soft lumber, and makes what mill men all look for, a cut free from ridges, and difficult to distinguish from that of the hand plane. The boxes for cylinder and rolls being cast on the machine makes very solid and rigid bearing, free from all vibration. The cylinder is of refined, wrought iron with twisted journals, and the bearings are long and lined with genuine babbit. A pressure bar goes on each side of the cylinder, thus insuring steadiness, even when planing short or thin stuff. The pressure bars are self-adjusting, always regulating themselves to the various lumber being planed. The changing of the machine to cut different thickness is quick and simple, the bed being raised and lowered by a single hand wheel. The feed rolls and cylinder being in stationary boxes, are always the same, and when the bed is raised or lowered, a glance at an index on side shows the thickness to be planed, and requires no further setting.

The four feed rolls are extra large, the front one being fluted, and are given extra pressure by double coil springs. The friction rolls in table are easily adjustable. The gearing is strong, and every device introduced to make a strong, reliable feed. It planes from one-sixteenth to six inches thick, and either eighteen inches or twenty four inches wide. A counter shaft is furnished if needed and can be either placed on the floor or under, as most convenient. The counter shaft has a flanged pulley on it to run to loose and tight on machine, thus stopping or starting the feed. The Berry & Place Machine Co., of this city, take particular pains in recommending this machine, which they guarantee to be a first-class one.

The copper mines of Arizona are at present returning larger profits upon the capital employed than is made in any other investment. The use of copper in the arts and the varied industries of the country is increasing. Most Arizona copper properties are far from railroad communication, and, notwithstanding the heavy expense of reduction, they are paying large dividends where energetically worked.

MINES now being opened by A. W. Callen, in Walnut Grove district, Arizona, have a healthy appearance. Everything is in readiness for the new mill.

CONCENTRATING works are to be erected on the Conway Castle property, near Galena, Idaho, Upper Wood river.

Mill Sites.

Mill sites are recognized by Sec. 2337 of the Revised Statutes, where the land is non-mineral, and is used by the owner of a vein or lode, and may be included in an application for a patent for such vein or lode, and can be patented with it, subject to the same preliminary requirements as to survey and notice as are applicable to veins or lodes; and the owner of a quartz mill or reduction works, not owning a mine or connection therewith, may also receive a patent for his mill site, as provided in the section.

There is this to remember, however: The

recorded in connection with lode claims by the proprietors thereof, whereby the land was legally appropriated; and, hence, that their prior location precluded location of the town site.

The Secretary of the Interior, on an appeal, reversed this decision of the Commissioner. The applications he held were by virtue of the provision under which there can be no mill site unless there is a lode or vein to which it may attach. The Secretary held to have the mill sites excluded from the entry of the town sites. Title must be first established to the mill sites. To do this the owners must show the non-mineral character of the ground. The Secretary thought this was not done, as not less than

cation was not made for mill site purposes, but to secure the same for town site purposes. This I think is quite apparent from the evidence. I think, as full opportunity was given to establish the title, there ought to be no further delay in this matter, and the patent for the town site ought to issue to the proper authorities, if their proceedings have been regular. It has been urged that if this town site is on mineral land, the entry ought to be canceled. That a town site may be located on mineral land cannot now be questioned. What are the rights of the lot-owners and mineral claimants within the boundaries of such town site, after entry, is a somewhat difficult question.

Taste and Odor of Minerals.

The chief of the so called chemical characters of minerals, or those which depend upon chemical composition, are taste, odor, solubility, fusibility and volatility.

Taste is a character of great importance in the case of some minerals. Thus, cyanosite, goslarite, melanterite, halite, or common salt, kalinite, nitre, nitratite, and a few other mineral substances, may be at once known by their taste, which is in each case very characteristic. The chief varieties of taste observed in mineral substances are as follows:

- Metallic—the taste of native metals.
- Metallic astringent—the taste of the vitriols.
- Sweetish astringent—the taste of alum.
- Saline—the taste of common salt.
- Alkaline—the taste of nitrate of soda.
- Cooling—the taste of nitre.
- Bitter—the taste of epsom salts.
- Sour—the taste of sulphuric acid.

The only minerals which have distinct taste are those which are soluble in water.

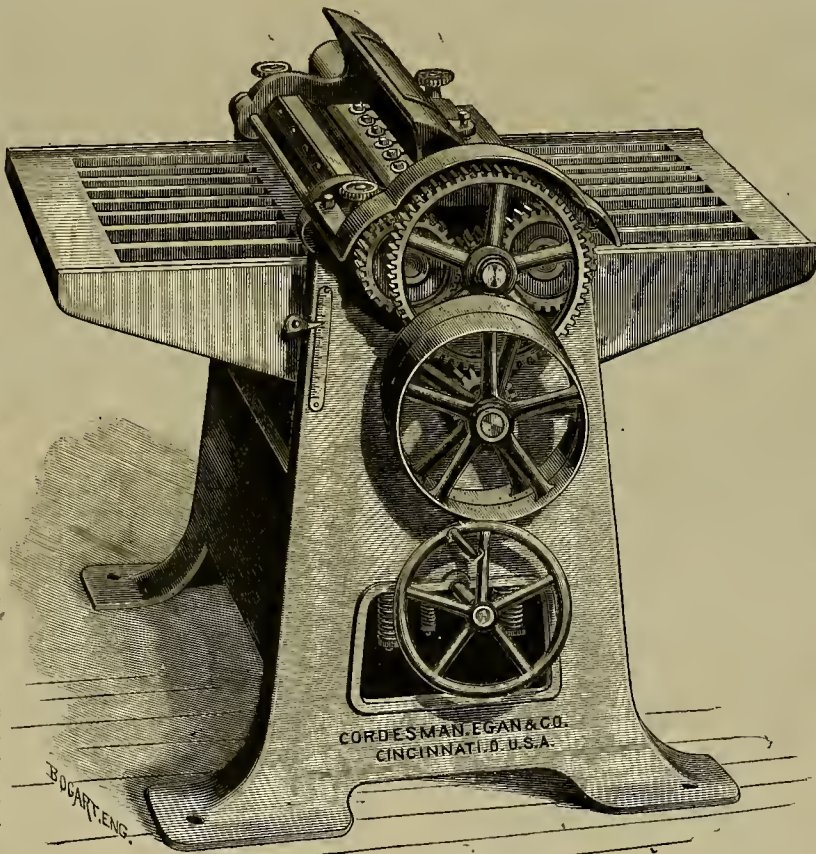
Odor is occasionally of importance. Thus many minerals containing alumina or magnesia give off a peculiar earthy smell when breathed upon; others which contain sulphur or arsenic when broken, rubbed or heated, yield a characteristic smell. The chief varieties of odor are the following:

- Alliaceous—the odor of garlic. It is observed on rubbing, heating or breaking ores containing arsenic.
- Horseradish odors—the odor of decaying horseradish. It is observable on heating or melting substances containing selenium.
- Sulphurous—the odor of burning sulphur, observable on heating, breaking, etc., many substances containing sulphur.
- Fetid—the odor of rotten eggs. It is given off by some varieties of quartz, barytes and limestone when broken or rubbed.
- Argillaceous—clayey. It is given off by serpentine and other substances containing magnesia.

INSTANTANEOUS FORMATION OF STEAM.—A firm in Paris, France, have patented an invention for the instantaneous formation of steam, which permits for its use at once in the cylinder of the engine. A pump sends the required quantity of liquid between two plate surfaces, which are heated, and between which there is only a capillary space. The liquid spreading in a thin layer evaporates at once, without going into the so-called spheroidal state, and this steam acts in the cylinder as fresh formed steam. The speed of the pump is regulated by the engine, the pump being connected with the shaft of the engine.

ALL is life and bustle in Walker district, Arizona. A great many houses are being built. The reduction works will be started in a very short time.

SILVER and copper mines were recently discovered north of Winslow, on the A. P. railroad, in formation similar to Silver Reef district, Utah.



THE EUREKA PLANING AND SMOOTHING MACHINE.

location of a mill site upon the public land of the United States does not operate as an appropriation thereof, so as to reserve it from town site location. The mill site men must show location, title and compliance with law as regards both lode and mill site, as required in a court of justice to establish such a claim.

Town sites may be located on mineral land. The question of relative legal rights of the town site and mineral claimant, as to occupation or possessory title to the surface, is not settled by any Land Office rules, but is left to courts of competent jurisdiction. It is the practice of the Interior Department of inserting in town site and mineral land patents mutual clauses of reservation.

Some time since certain mill site owners protested against certain town site locators in Colorado, to prevent an issuance of patent. The Commissioner of the General Land Office decided that the land in question was non-mineral; that the mill sites were duly located and re-

16 lode claims were marked on the map of the town.

The Secretary says: It is true that the statute is silent as to the location of mill sites; but it is not unreasonable to suppose such location must be made substantially as that of a mining claim. Such mill site location must be made by the owner or proprietor of a lode or a quartz mill or reduction works. The letter of the statute would seem to require that such mill site ought to be used in connection with such lode for mining or milling purposes, before a legal location can be made; it is not, however, necessary to determine that question in this case, for there is no proof that the protestants were the proprietors of any vein or lode. The protestants did not introduce location certificates of lodes, and, in connection with such lodes, the mill site locations; but there is no evidence that the lodes were taken in accordance with law; it does not appear that the locator complied with the local laws or the United States statutes concerning such location and the development of such lodes. Much has been said with regard to the good faith of the protestants as to the location of the mill sites, and it is charged that such lo-

CORRESPONDENCE.

Saving Flour Gold.

EDITORS PRESS:—In the PRESS issue of the 10th inst., in reply to Mr. F. W. Noble's letter, you give the best method of saving fine gold of which you "have any knowledge." I am a little interested in this subject, and with your permission, would like to say a few words in regard to it in your valuable paper.

Mr. Noble's statement that the gold on Snake river is free from iron rust may be correct, yet I do not believe that gold is found in gravel mines with a clean metallic surface. The surface of gold, when perfectly clean, has a strong affinity for mercury; but mercury, in its turn, must have a live, or bright surface; that is, be free from oxide before amalgamation can take place.

The silvered and mercurial plate, without doubt, has some advantages over the ordinary amalgamated copper plates, but, unfortunately, by a constant grinding, similar to that produced by a sand blast, these plates become coated with flour mercury, which has a great affinity for oxygen, thus retarding or utterly preventing amalgamation of fine gold. To prevent this, however, sodium amalgam has been used to great advantage. Again, these plates, when placed in the bottom of a sluice box having a great fall, will be found soon worn out, and retaining little or no gold. If the box, however, has but little fall, the surface of the plates will soon be covered with a layer of magnetic iron sand that prevents the gold from coming in contact with the mercury.

It is well known among miners that running water will carry with it fine particles of gold in suspension, and that muddy water holds a larger percentage of these particles; that they are usually flakey or flattened, rendering them buoyant; thus, being lighter than the sand, they are readily carried away with it. If an ounce of pulverized gold-leaf, for instance, and the same weight of finely pulverized marble are let fall from the same height, the gold will be found floating in the air, on account of its flakey nature, when the marble has all settled on the ground.

To this flattened or flakey condition, more than to any other thing, can be attributed the great loss of flour gold. The majority of placer mines are now, and always have been, richer in flour gold than in coarse gold, and how to save fine gold has always been a very important question.

Inventors have given much valuable time, and spent a considerable amount of money in the construction of gold-saving machines; however, little is known as to the results. I certainly side with you in regard to "toy machines," also that the best results cannot be obtained through carelessness and inexperience. I am thoroughly satisfied that a very high percentage of flour gold can be saved, as such has been precisely demonstrated at the placer mines of the Santa Rita mountains, Pima county, A. T., by an invention of a new principle, as I understand, in which specific gravity plays no part. The company making use of the invention are said to be thoroughly satisfied with its workings, saving besides coarse gold \$5 to 90 per cent. of the flour gold that otherwise would have been lost. I am not personally acquainted with any member of the company, but am told Mr. R. R. Richardson, of this city, is its president. If Mr. Noble, or any other miner who is interested in the saving of flour gold, will make inquiries of the above named gentlemen, perhaps they may obtain some valuable information, as the company do not make a secret of their success. F. A. OBERMATT, JR.

Tucson, Arizona, March 13, 1883.

A NEW ELECTRIC GENERATOR.—A new method of generating electricity has been discovered by Dr. Brand of La Rochelle. He has an electro-generative torch or candle which yields a current of electricity in the act of burning. It is thus described: It is prepared by making a paste of coal dust and molasses and molding it into a stick which serves as the inflammable wick of a candle. This rod is then covered with asbestos in a thin sheet, and dipped into fused nitrate of potash until a good thick coating of the nitrate adheres. The wick being ignited it burns away, and a current of electricity is drawn from the candle by wires inserted into the nitrate and the coaly wick. It is stated that Dr. Brand is experimenting to construct a fireplace so that the fuel burning in it will develop an electric current sufficient to ring electric bells or charge an accumulator and thus give light also. The discovery is as yet in its infancy, but scientific men in Europe think it will lead eventually to great results.

AN ASBESTOS BALLOON.—A fire-balloon has been made, in which the lower part is constructed of asbestos cloth, while the upper part is covered with a fire-proof solution. A spirit-lamp is used to supply the hot air for inflating it, and, being fire-proof, there is no risk as with ordinary hot-air balloons. The system is said to be specially valuable for war balloons, as a supply of spirit can be easily carried where it would be difficult to take the appliances for preparing gas.

Peabody.

A Live Company Makes a Live Camp.

From Mr. M. H. Smith, until recently a dweller in Tombstone, but now a business man in the new town at the Peabody mine, a reporter on the *Republican* learned the following facts:

The Peabody Company, under its new purchasers and the able management of Mr. Johnson, the general manager of the concern, have to a great extent torn down, overhauled, remodeled and rejuvenated the entire affairs at the mines and smelter. The smelter has been taken down and removed from its old site to within about 150 feet of the mouth of the mine. The water supply has been augmented and a steam pump has been put in which elevates the water to a height of 80 feet above the town, where an immense tank has been put up which will supply the mine, smelter and population. Another smelter has been ordered, and both of them will be in running order about the 5th of April. They are so arranged that the ore as hoisted from the mine is hauled on a tramway, upon which the car runs to the rock breaker and deposits the ore, which, after having passed through the crusher, falls into a bin near the smelters, from whence it goes into the furnace and comes out black copper.

The developments on the Dreadnaught mine are not favorable. A contract has been let to sink 100 feet on the Copper King, which is a promising location. The company have 103 men on the pay roll, among whom is not one Mexican or Chinaman. They pay four dollars per day for top and bottom men, and do not propose to debase their countrymen by bringing them into competition with cheap labor of any nationality.

The owners of the property are Lake Superior copper men with immense capital. Mr. Johnson, the general manager, has had 20 years' experience in the mines of Lake Superior, and knows just what he is about. He is also a heavy owner in the company. The people there all speak in the highest terms of the man. To show what sort of a man he is, a brief recital of the foundation of the new town is necessary. When the smelter was removed from its old site, three miles away from the mine, that event destroyed the prospects of Russellville, the old town; so people began to cast about them for a new location. They hit upon a place one fourth of a mile from the Peabody mine. The lay of the ground was most eligible for building purposes, but the surface belonged to mining locations. To settle all questions, the owners deeded the surface to Mr. Johnson in trust for actual settlers, and Mr. J. G. Parke, late of Tombstone, the company's engineer, went to work and surveyed the place off into blocks, lots and streets.

The streets run with the cardinal points of the compass, and are 80 feet wide. The lots are 30x150 feet, and each block has an alleyway through the center 20 feet wide. When 300 bona fide settlers have located and built upon lots which they are allowed to locate, a petition will be made to the probate judge to the property, and they will be assessed pro rata to pay the cost of survey, records, deeds, etc., when the remainder will belong to the town site company and will be sold by them. Thus it will be seen that there will be no contest over the matter with any one, and every person will get a good title to their property for a nominal sum. Mr. Parke is deserving of a portion of the credit for this happy solution of the town site question along with Mr. Johnson.

The town has now a population of 300 people and building and improvements are the order of the day. There are seven business houses that now pay license, and this number will be greatly added to as men get up houses and the necessary improvements. Mr. Smith has built an elegant saloon, which has just been opened, and Andy Meham has another nearly ready for occupancy. The old hotel at Russellville will be moved down to the new town in a short time, which, with the restaurants and lodging houses now in operation, will accommodate the residents and traveling public.

Last week there was a large party of eastern capitalists at the mine, among whom were several owners in the Peabody. They were delighted with the showing of wealth in the mines. It is predicted that the new order of things will build up one of the greatest copper centers in Arizona and will add a million or more to the taxable property of Cochise county. The Williams brothers will now have to look to the laurels of Copper Queen for they have a rival in the field worthy of the name.

MACHINERY STEEL.—The *American Machinist* says that machinery steel is not easily welded sometimes, and the following plan, which was hit upon after experiment, proved successful. A good heat was taken, the two bars placed together and lightly tapped to stick them fast. The weld was then put in the fire again, a good heat given, and the scarf thoroughly hammered. This proved a success every time. No borax was used.

A NEW STORM INDICATOR.—*Les Mondes* reports that M. Dufourcet has, in the exposed court of his house, two bars of iron planted in the earth, to each of which is fixed a conductor of coated wire, terminating in a telephonic receiver. He consults the apparatus twice or thrice every day, and it never fails through its indications of earth currents to give notice of the approach of a storm 12 to 15 hours before it actually arrives.

The Coronado Mines.

The Clifton *Clarion* (Arizona) says: At the time of the purchase by the Scotch syndicate of the mining properties of the Lesinsky Bros., the Coronado group, being the farthest away, had the least development done on them, although, in the opinion of practical miners, there were no mines in the district which gave promise of producing more bullion when developed, an opinion which was coincided in by the experts sent out from Scotland and the East to examine the various properties and report upon them. After the sale was completed and the transfer made, the extension of the narrow-gauge railroad was pushed along rapidly, and by the last of March or the fore part of April at the farthest, the cars will be running to these properties. The Coronado mines proper consist of six locations, running consecutively from east to west on Coronado mountain. Beginning at the eastern slope of the hill, they are named as follows: Matilda, Copper Crown, Crown Reef, Coronado, Horseshoe, and Boulder, 9,000 feet long in length of surface ground, besides other properties. From the Matilda down to the Boulder, a distance of one and a half miles, there is a vertical difference in depth of 1,000 feet, and over this entire distance the croppings are very plain. The ore body is a well-defined contact vein, with syenite on the north side and quartzite on the south. The principal work has been done on the Matilda and Copper Crown on the eastern slope, and on the Horseshoe on the western slope, running down toward Eagle river. The upper incline railway passes through the hill by a tunnel cut on the ore vein. "This tunnel, when completed, will be 1,200 feet in length. It is now in just about half of the distance. This tunnel will afford facilities for getting out the ore from the Horseshoe and other claims on the extreme west, which will be connected with the main track by means of incline railways, and at the same time stopping can be done at any point along its entire length with but slight interruption to the transfer of cars. This tunnel enters the hill at a point 306 feet below the summit. The present workings on the eastern slope consist of three levels, the main, or railroad tunnel, one 80 feet above it, and one 100 feet below, numbered from above one, two and three. These levels are connected by winzes, and the ground is ready to stop whenever the ore is needed. The vein being vertical, work will be continued by winzes and levels. The Horseshoe shaft, on the western slope, has been sunk to a depth of 165 feet. At a depth of 100 feet, crosscuts were run north and south, cutting the north wall in 25 feet, and the south wall in 43 feet. In the north crosscut, low-grade ore was found the whole distance; in the south one or two veins were cut, four and six feet in width. The average width of the vein in the Coronado mines is four feet, and the assays average 14 per cent. copper, the assay statement being the result of hundreds of tests. This group, as well as the other mines of the Arizona Copper Co., are under the charge of W. S. Smith, C. E., and directly in charge of Mr. J. C. Schmitt, who, as foreman, assumes the direction of the workings underground.

Low Grade Ores.

Cheap Method of Working Them.

The *White Pine News* has the following relative to working low grade ores: "Supt. Foulke has for several weeks been experimenting with two of Frue's concentrators at the Star mill. We took a walk up to the mill a day or two ago, and found these machines running smoothly and in perfect order. Five stamps are used to crush the pulp that feeds them, and, of course, the poorest grade of ore is selected for these stamps. By this method of concentration, 25-dollar ore is worked to a profit, 75 per cent. being realized from its assay value. No. 30 screens were at first employed on the concentrators, but a gradual grading down showed improved results, until now a No. 16 is in use and Mr. Foulke thinks a No. 12 or 14 will be an improvement even on that. The result of the experiments so far has been entirely satisfactory, and Mr. Foulke believes that this process will prove the salvation of his company, and cannot fail to work wonders for all districts whose mines carry large quantities of low grade ore that cannot be worked at a profit under the old milling system. Another very important item resulting from the concentrators is that the grade of the bullion produced is much finer; the Star bars have improved in grade from 470 to over 600 since the new system has been in operation. It also saves much labor in handling and sorting ore, the services of seven men in this capacity having already been dispensed with at the Star.

"If this system of concentration can successfully be applied to all the ores of this district—and there appears no reason why it cannot—we may confidently look for three or four companies operating here in the not distant future. There are thousands of tons of low grade ore here that only await some cheap process for profitable reduction. We shall watch with interest the Star Company's progress with Frue's concentrators, and from time to time note the result. If it proves as successful as its owners predict, it will surely cause a revolution in the industry of hundreds of now almost deserted camps in Nevada, and place those that are struggling against heavy odds for existence on the high road to prosperity."

Santa Fe District.

A Promising Region for Prospectors.

A correspondent of the *Virginia Enterprise* writing from Luning, says: The Occidental copper mine, situated in Santa Fe district, three and one half miles east of Luning, on the Carson and Colorado railroad, is, we believe, the coming copper bonanza of Nevada. It is a blind ledge, but is found by exploration to be from 150 to 200 feet in width, and is already opened in nine different places, a distance of 1,000 feet along its course. Its ores are excellent, containing almost all kinds and characters of copper. Red and black oxides, carbonates, peacock, native bluestone and native coppers, are found in this mammoth ledge, and the ledge shows wonderful strength as depth is attained.

We do not hesitate to say that we believe the Occidental copper mine to be one of the most valuable and promising copper mines in the State. There are already thousands of ore, of good quality in sight, and it contains iron sufficient for smelting.

The location is most favorable, as an excellent site for a smelter can be had, with an abundance of water in sinking 60 feet, within a mile and a half of the mine, all the way down grade. Already the company has completed a good wagon road from Luning to the mine, which is of great value to its owners, as a wagon can drive directly to the ore dumps, and no packing with animals is required.

This mine was lately discovered by its present owners, the Chrisman brothers, formerly of Dayton, who have for the past nine months kept up a continuous search with untiring zeal for precious metals in this locality, and who are now handsomely rewarded.

The company are sinking a shaft on the ledge, which is down several feet, all the way in gold smelting ore. In the shaft has been encountered a large deposit of very rich ore. Native copper has been found all through it. This is being prospected by a drift from the shaft. Samples of ore taken from this rich find in the shaft goes way up to 50%, 60% and 70%.

It is simply wonderful the amount of copper in this mine. Dig almost any place you may, and by removing but a few inches of the surface good copper is found. It seems to be a whole hill of copper. The formation is granite and black lime.

There are also several other good mines joining and lying near the Occidental. Among them are the Hawkeye, Mocking Bird, Cabin and Nevada, all showing very fine specimens of copper. As high as 36 per cent has been found almost on the surface. But little work has been done on any of these, but with proper exploration, I believe they will prove good properties. There are many other good mines in this district. To the north lies the Calamity, Illinois, Sweet Vengeance, and many more, all good and valuable mines. The Illinois and Sweet Vengeance, I understand, are already bonded for quite a sum to eastern capitalists. To the east, lies the Tiptop, Copper King, and many other valuable mines.

What this district most needs is smelters, and I understand some New York capitalists are here for the purpose of erecting a smelter in this vicinity. This country is only in its infancy as regards mining and prospecting. New and valuable discoveries are being made almost daily, and with the return of spring there will be a grand rush for this country by capitalists and prospectors, and no doubt many new and valuable discoveries will be made, as copper is attracting the attention of the mining world more and more every year. This is sending many in search of this valuable and profitable metal.

COPPER MINING.—The Omega Copper Mining Co., of Philadelphia, have recently contracted with the Pacific Iron Works, Rankin, Brayton & Co., San Francisco, for one of their famous water jacket smelters to be erected at once upon their mine in the Helvetia district, near Tucson, Arizona. The Omega is a well developed mine, and gives promise of being one of the most productive and valuable mines in that Territory. We feel assured that this company have made no mistake in the selection of their reduction works. The Pacific water jacket for both copper and galena ores, have been a most signal success in all parts of the country and with all classes of ores, and we know of no other that can be considered as anything more than an experiment. In the interest of mining, it may be said that no company can afford to purchase any machinery but that of established character and reputation. The Chicago branch of the Pacific Iron Works, recently established, has, we understand, a large amount of iron work in hand destined to various localities. The establishment of these works is a much needed enterprise, and a matter of genuine satisfaction to Eastern mining operators, who are thus enabled to avail themselves on this side of the continent of the practical experience and skill of this well-known firm, and we predict for them a large and constantly increasing trade. All parties contemplating the erection of any kind of mining, milling or smelting machinery would doubtless consult their interest by communicating with them. *Philadelphia Mining Journal*.

A REPORT comes from Silver Canyon, says the *Cherry Creek News*, that a very important strike has been made in that camp. Much excitement is said to have prevailed over the affair, and many new claims were located.

MECHANICAL PROGRESS.

The Relative Economy of Solid and Gaseous Fuel.

The London *Journal of Gas Lighting* states that an article in a recent number of *Le Gaz Belge* deals with the question of the economy of gaseous as compared with solid combustible for domestic or industrial purposes. The writer commences by remarking that when combustion takes place, the quantity of oxygen required by the carbon does not by any means correspond with that required by the hydrogen; and as these elements are not generally separated, a certain quantity of one or the other must be burnt to waste. The carbon can only combine with the quantity of oxygen necessary to form carbonic acid, and the hydrogen takes up only that which will produce aqueous vapor. The former of these elements therefore always absorbs more oxygen than the latter, supposing that there is sufficient to ensure complete combination.

When solid fuel is employed, it is not only necessary to provide the supply of oxygen required for combustion, but also to convey into the furnace sufficient air to drive off the products of that combustion, by ensuring the contact of the oxygen with the whole surface of the combustible material. In practice it is found that nearly twice the quantity of air theoretically required has to be provided; and this, of course, doubles the volume of the gases that have to be heated. It may thus be assumed that half the air admitted into a furnace does not serve for combustion; and this excess of air naturally carries off a considerable quantity of heat. The loss, however, is a necessity; for, if less air were supplied there would be a possibility of combustion being incomplete, and the evil would become greater. In fact, the carbon passing into the condition of carbonic acid (the result of the most complete combustion) develops 7,200 heat units; while with a less perfect transformation it furnishes carbonic oxide, giving only 1,400 heat units. When gaseous combustibles are utilized, these losses may be prevented; since very nearly the determined quantity of oxygen may be supplied, and this be caused to mix more closely with the combustible elements, without necessitating the expenditure, on the part of the mixture, of an amount of energy comparable with that required by the solid combustibles.

The commercial value of the two kinds of combustibles may be approximately stated as follows: Coals have, according to their quality, a standard of from 4,500 to 7,500—say an average of 6,000—heat units. From this number must be deducted 500 heat units lost in effecting combustion. There remain, therefore, 5,500 heat units. Now, the absolute available heat of furnaces employed for industrial purposes does not exceed 40% of their theoretic heating capacity, and, therefore, the effective calorific power is reduced to about 2,000 calories. The cost of furnace coal of average quality ranges from 6 to 8 frs. per 1,000 kilos—say 0.8c. per kilogramme (2.2 pounds). The 2,000 calories heating power, therefore, cost 0.8c. If coal gas is taken as the element of comparison, its yield in heat being 12,000 units of the net cost of 7c., the ratio becomes 1:4 for coal and gas respectively. This, however, is exclusive of the cost of labor, maintenance of appliances, transport of fuel, etc., all of which would double the net cost of the solid combustible material. So that the proportion really becomes 2 for coal and 1.4 for gas. But the solid combustible furnishes only 2,000 calories, while, if it is transformed into lighting gas, it would furnish 3,000 calories. The final ratio of net cost, therefore, becomes 3 for coal against 1.4 for gas; in other words, the employment of illuminating gas as a combustible is attended with about twice the economy that results from the use of ordinary coal.

PAPER RAILS AND CAR WHEELS.—The *Northwestern Lumberman* is quite skeptical in regard to the introduction of paper as a substitute for iron in the manufacture of rails. That paper thinks the accomplishment of the idea is extremely doubtful. In the first place, it claims that there is literally no such thing as a paper car wheel. The office of paper is merely to furnish filling, the plates and bands being of iron. If the friction and pressure were applied to paper direct, it could never stand a fraction of the grief to be encountered. It is hardly more probable that a paper rail could do any more. If it is an iron or steel rail on the half shell, stuffed with *papier mache*, it may be different; but a chunk of paper that will turn the point of a spike must be in somebody's mind.

A SAFETY valve should be large enough to discharge all the steam the boiler is capable of making. The following rule is that enforced by the United States Government in fixing the area of safety valves for the boilers of ocean and river vessels, when the ordinary lever and weight safety valve is employed. When the common safety valve is employed, it shall have an area of not less than one square inch for each two feet of grate surface. The following rule has been prepared by Prof. Thurston: Multiply the pounds of coal burned per hour by 4, and divide this product by the steam pressure, to which the constant number 10 is added,

Can Iron be Burned in Melting?

The following answer to the above question is given in a contemporary: The writer, a few days since, met a foundryman who was in constant fear of getting his iron too hot. He claimed he was melting his iron just as hot as possible without burning—that if he melted it hotter it would surely be burned. This is one of those strange delusions that sometimes trouble the minds of otherwise sensible people. Now, this man, and any others who may entertain the same views, what basis have they for their opinions? A few years ago the question arose in a foundry, and might fairly be asked: "Can iron be burned in melting in a cupola?" To settle this, test bars were cast at one heat, just coke enough being used, as some would claim, not to burn the iron. The next day test bars were cast of exactly the same dimensions and from the same mixture of iron, enough coal being used to melt the iron so hot that it was yellow, a titful flame arising from it when in a dry ladle. The bars from the two heats were afterwards tested in a testing machine, when it was found that the bars cast from the hot iron were more than nine per cent. stronger than those cast from the iron which was said to be just as hot as could be made without being burned. Now for the reason: It is generally the case that in putting up iron for ordinary machinery castings, two, three, four or perhaps five kinds and qualities of iron are used. It is of the utmost importance, especially for such castings as cylinders, steam-cylinders, cylinder heads, and finished work generally, that the castings be made homogeneous.

When iron melts in a cupola, it is essentially different from the melting of ice in water. The iron gets soft till it falls in pieces from the pig, and these pieces into still smaller pieces, and the liquid condition is assumed, which means the separation of the molecules that were united to form the solid iron. Now, the hotter the iron gets, the more complete the separation of the molecules of each particular brand, and the more readily they will mix when they come together in the bottom of the cupola. As soon as the disintegrated pig gets hot enough to liquefy, it does not stop long in one place, but descends to the bottom of the cupola, and any additional heat it receives must be imparted in the transit from the melting point to the bottom. It is not claimed that too much fuel cannot be used in a cupola. On the contrary, a surplus over and above that required to melt hot liquid iron may be used, which means an extravagant use of fuel. It has no effect on the quality of the melted iron, but it has the effect to make the cupola melt slow, and enough fuel may be put in a cupola to absolutely prevent melting. In stove-plate foundries iron is generally melted much hotter than in machinery foundries, and the writer has always observed that in foundries where the iron is melted hot, the average of the work is much better, and the percentage of poor castings is much less, than where so much caution is exercised to prevent burning the iron in melting.

Steam Boilers.

The strength of iron in boilers is not much affected by the working temperatures up to considerably over 400° F., nor by the low temperature down to the freezing point. But, when the temperature of the plates, through the absence of water or from any other cause, rises much above 500°, then a change commences. Above 750° the tenacity diminishes very rapidly, and when the plates become red-hot, they have lost fully half their usual strength.

As riveted joints destroy the elastic homogeneity of the boiler, the waves of expansion, contraction and vibration are arrested there by the greater rigidity of the riveted double-thickness of metal, which tends to localize the fatigue sustained by the iron near these points, and it also appears to increase the susceptibility to corrosive action, since the furrows generally take the line of that fatigue, and are often deeper than the spots on the plates.

Flues of 16 inches diameter must not be less than one quarter inch thick, other flues in proportion, and not less than three inches from the shell.

A 42-inch boiler, single riveted of one fourth inch iron, will safely bear a working pressure of 110 pounds to the square inch, and must be tested to a hydrostatic pressure of 165 pounds to the square inch.

The experiments made by Fairbairn in 1838 have served, up to the present time, as the basis of calculating the strength of riveted joints. According to these experiments, the strength of a double-riveted joint is 70 per cent. of the strength of the plate; and of a single-riveted joint 56 per cent. Of these experiments it is necessary to remark:

1st. That the results are only for the case in which the rivet holes diminish the section of the plate 30 per cent., while for the most part in practice, and particularly for the single-riveted joint, that loss is very much greater.

2d. That the experiments were made on plates of only 0.224 inch thickness.

3d. That the experiments gave 46, and not 56 per cent., for the strength of the single-riveted joints.

THE parties who purchased the Centennial building, in Philadelphia, for \$97,000 have already realized \$405,000 from the iron in it, and have sold the debris for \$100,000.—*Ex.*

SCIENTIFIC PROGRESS.

Electric Excitement.

We recently made some allusion in this column to a device introduced by Mr. F. W. Whiting, of Boston, by which the belts, machinery and surrounding air in a factory are relieved of the electricity generated by the moving machinery. It is well known that the presence of electricity so generated in a cotton or woolen factory is often the cause of much annoyance, sometimes affecting the fibers of wool and cotton to such an extent as to seriously impair the character of the goods in process of manufacture.

It is well known that wires have been attached to belts and grounded, by way of water pipes, for many years, and the electricity thus carried off; but the novelty of Mr. Whiting's method consists in two points. First, in attaching to the wire, by which the electricity developed on the belt is conveyed to the water pipe, a set of round balls in place of points. Electricity, being a form of energy developed upon surfaces, is more easily gathered upon the balls than upon the points. But the completion of this method requires that the machines themselves shall also be "grounded," by a wire attached to some part of the machine, and conducted to the ground by wire to a water pipe, or in some other method. This puts each machine into an electric circuit, one pole being at the belt, the other at the machine. In this way, the current of electricity is carried away from the stock, instead of through it, into the atmosphere, each machine or set of machinery forming part of an electric circuit grounded at both poles.

It often happens that the trouble on a speeder, for instance, is often caused by the electricity generated by a belt a long distance off, and conveyed by the shafting through the room. In this way the entire space may be filled with electricity generated at one end of a room.

This double arrangement of Mr. Whiting's is attracting the attention of cotton spinners and wool carders, and has already been applied with marked success in one of the largest New England mills. Thus far the application has been made wholly on cotton work, but attention is now being given by the gentleman who has devised this attachment, to the electricity on the rub rolls of a finisher card. Unlike most improvements of this kind, it will not be patented, as it is devised for the benefit of the members of the company with which Mr. Whiting is connected, and freely given to the world by the inventor.

THE COLOR OF PURE WATER.—Simple as such a thing may appear to be, it has nevertheless been found very difficult to determine the color of pure water, or at least scientists differ quite widely in their estimates. A special effort has recently been made by Herr Victor Meyer to settle this question, and he has found that it is a shade between blue and green. Taking two glass tubes 40 millimeters in diameter and about 1.5 meters in length, he connected them by means of rubber tubing, forming a tube about 7½ meters long. Both ends of this tube are fixed in glass plates and fitted with metal sockets, which are provided with brass nozzles for filling the tube. All being arranged, the tube is placed in a perfectly horizontal position and covered with a black cloth. Upon looking through the empty tube, the field of vision appears colorless, as the cloth and the metal sockets prevent the glass from exerting any influence. As soon, however, as the tube is filled with distilled water, an intense bluish green color is observed.

A TRIBUTE TO DR. DRAPER.—Mr. Richard A. Proctor pays, in *Knowledge*, the following tribute to Dr. Henry Draper: "We hear with extreme regret of the death of Dr. Henry Draper, Professor of Physiology at the University of New York. It has followed very soon after the death of his father. In Dr. Henry Draper science loses an honest and zealous worker, one who has devoted time without promise of reward to his scientific work; nay, has expended more money in his free gift of labor to science than some advocates of the Endowment of Research have begged for. The discovery that oxygen, and probably nitrogen, exists in the atmosphere of the sun is due to Dr. Draper, and would of itself suffice to keep his memory green. Scarcely less important, however, was his success in photographing the spectra of stars and planets, of Wells's comet, and the great Orion nebula. The zeal and devotion with which he discussed the photographic methods available for observing the transit of Venus in 1874 were fully recognized by his fellow workers in science, and even, wonderful to relate, by the government."

THE FORMATION OF CRATERS IN THE MOON.—At a late meeting of the Academy of Sciences at New York, experimental researches on the formation of the peculiar craters in the moon were communicated by M. Bergeron. He sends hot air through a brass tube into a melted but gradually cooling mass of Wood's alloy. The huddling of the air forms a circular space, first like a circus ring and then like a crater. Soon, however, the mass becomes pasty, and forms a cone in the middle. Some slightly different effects were had with other alloys, such as a more broken up appearance on the side of the cone. An interruption of the current gave rise to the formation of two concentric craters.

A New Sweet Compound.

C. Fahlberg, in a paper read before the Franklin Institute, Jan. 17th, furnishes some interesting particulars in relation to his discovery of a certain sweet compound in the hydrocarbon of the coal tar group. He describes the sweetness as being very intense. As soon as he made the discovery he proceeded at once to determine whether it was poisonous to take it in larger quantities or not. At first a cat and then a dog were subjected to experiment, but they remaining alive and apparently not in the slightest degree affected by it, the discoverer decided to take several grammes of it himself. The result was not the slightest inconvenience experienced from it. A chemical test of the urine, made the next morning, showed that almost the entire quantity taken could be thus recovered.

The compound obtained, and which contained the sweet principle forms salts with any carbonate of the alkalis, alkaline, earths or metals, and all of which taste sweet. It is, however, not an acid, but belongs to a class of bodies to which the name "Sulphines" has been given; the compound in question being benzole sulphide. It is very readily soluble in alcohol, more so than in cold water, in which it only dissolves readily when it is hot. The discoverer says:—"I am making the attempt now to prepare it in larger quantities and by cheaper methods, and have no doubt that it will find extensive use in medicine and for technical purposes. One experiment made was to sweeten glucose, which, as you all know, tastes only faintly sweet, and the result was a complete success. As soon as I shall have found the method by which to prepare it on a manufacturing scale I shall come before you again, and as I trust and hope, with larger samples than now, ready to give answer to all questions in regard to its price, application, etc."

HEAT AND MAGNETISM.—L. Pilleux has lately called attention to the heating of iron during its magnetization. The fact had previously been observed by D. Tommasi in some researches, which are not yet published, upon the comparative study of the chemical properties of ordinary iron and of magnetized iron. In order to obtain a constant magnetic intensity he employed an electromagnet of single branch in place of an ordinary magnet. When the current, even if it was produced by a weak battery, had traversed the coil for some hours, the magnetized bar became perceptibly warm. He at first attributed the heating of the iron to the heating of the coil; but he was greatly astonished one day when he had removed the bar in order to clean it and had forgotten to interrupt the current, to find that the coil was not heated at all.—*Les Mondes*.

LIGHT OF COMETS.—According to Huggins, comets emit a characteristic light which indicates, by spectral analysis, the presence of carbon, hydrogen and nitrogen, elements which are shown by the spectra of acetylene and cyanhydric acid. Berthelot thinks that these results point to an electric origin of the light. He has shown that acetylene is formed immediately and necessarily whenever carbon and hydrogen come under the influence of the electric arc. When nitrogen is added to acetylene the electric influence produces cyanhydric acid. It seems scarcely possible to conceive of a continuous combustion in cometary matter, but an electric illumination may be easily understood.

THE ACTION OF CEMENT ON LEAD PIPE.—Herr Bamberger reports the following *apropos* of his examination of a piece of lead pipe which had rested for years in a layer of Portland cement: It was coated with a red layer 1 to 3 mm. in thickness, resembling litharge in appearance, with a composition PbO 85, Pb 13, other matters 2. This film was carefully removed. Its specific gravity was between 8.002 and 9.670, the difference being due to the presence of adhering metallic particles of lead and lead carbonate. This coating appears to have been produced by the action of the oxygen of the air, in conjunction with that of the lime contained in the mortar, from which it would appear that lead in contact with lime, and with access of air and moisture, is actively corroded; a hint which builders, plumbers, and others, would do well to bear in mind.

THE HIGHEST MOUNTAIN PEAK.—For many years Mount Everest, in Nepal, has been considered the highest mountain in the world, reaching the respectable height of 29,002 feet. Dhawalagiri and Kuchinjunga, in the same range, with about 28,000 feet each, shared the honor between them until Major Everest, of the Bengal Engineers, discovered their big brother. Before they were measured, Humboldt thought some points in the South American Andes reached the highest altitude on our globe. But quite recently Capt. J. A. Lawson has discovered in the little-known island of New Guinea, a peak that is still higher, which he has appropriately called Mount Hercules, and fixes its elevation at 32,786 feet above the level of the sea.

BLEACHING BY ELECTRICITY.—Dobbie and Hutcheson have experimented upon bleaching by the aid of electrolysis. For this purpose the stuff is dipped into sea water and then passed through hot rolls which are connected with the poles of a galvanic battery. In order to decompose the hypochloride which is thus formed, the cloth is drawn through diluted acid and fully bleached.—*Dingler's Journal*.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING FEB. 23.	WEEK ENDING MAR. 7.	WEEK ENDING MAR. 14.	WEEK ENDING MAR. 21.
Alpha.....	15c	35c	35c	1.05
Alta.....	15c	35c	35c	1.30
Andes.....	15c	35c	35c	1.05
Albion.....	25c	1.15	15c	30c
Argenta.....	5c	75c	50c	60c
Atlas.....	50c	75c	40c	55c
Belcher.....	3.35	4.40	2.25	3.70
Belling.....	1.00	1.05	1.00	1.05
Best & Belcher.....	1.00	1.05	1.00	1.05
Bonanza.....	1.00	1.05	1.00	1.05
Bodie.....	1.00	1.05	1.00	1.05
Bullion.....	1.00	1.05	1.00	1.05
California.....	1.00	1.05	1.00	1.05
Challenge.....	1.00	1.05	1.00	1.05
Chollar.....	1.00	1.05	1.00	1.05
Columbia.....	1.00	1.05	1.00	1.05
Crown Point.....	1.00	1.05	1.00	1.05
Day & Smith.....	1.00	1.05	1.00	1.05
Deer Creek.....	1.00	1.05	1.00	1.05
Elko.....	1.00	1.05	1.00	1.05
Empire.....	1.00	1.05	1.00	1.05
Esmeralda.....	1.00	1.05	1.00	1.05
Excelsior.....	1.00	1.05	1.00	1.05
Farwell.....	1.00	1.05	1.00	1.05
Florida.....	1.00	1.05	1.00	1.05
Gould & Curry.....	1.00	1.05	1.00	1.05
Hale & Norcross.....	1.00	1.05	1.00	1.05
Hill.....	1.00	1.05	1.00	1.05
Independence.....	1.00	1.05	1.00	1.05
Jonestown.....	1.00	1.05	1.00	1.05
Kennecott.....	1.00	1.05	1.00	1.05
Leadville.....	1.00	1.05	1.00	1.05
Littleton.....	1.00	1.05	1.00	1.05
Monarch.....	1.00	1.05	1.00	1.05
Mountain.....	1.00	1.05	1.00	1.05
Northern.....	1.00	1.05	1.00	1.05
Occidental.....	1.00	1.05	1.00	1.05
Opit.....	1.00	1.05	1.00	1.05
Overman.....	1.00	1.05	1.00	1.05
Potosi.....	1.00	1.05	1.00	1.05
Pyramid.....	1.00	1.05	1.00	1.05
Real.....	1.00	1.05	1.00	1.05
San Bernardino.....	1.00	1.05	1.00	1.05
Standard.....	1.00	1.05	1.00	1.05
Union.....	1.00	1.05	1.00	1.05
Utah.....	1.00	1.05	1.00	1.05
Valley.....	1.00	1.05	1.00	1.05
Yellow Jacket.....	1.00	1.05	1.00	1.05

Sales at San Francisco Stock Exchange.

THURSDAY, A. M., MAR. 22.	100 Alpha.....	1.30
450 Alta.....	41c	43c
80 Bodie.....	90c	95c
350 Belcher.....	75c	80c
250 Con Virginia.....	30c	40c
300 Challenge.....	40c	45c
80 Chollar.....	1.10	1.20
100 Crown Point.....	1.15c	1.20
100 Con Imperial.....	30c	40c
100 Eschschuer.....	30c	40c
200 Gould & Curry.....	2.50c	2.60c
250 Hale & Norcross.....	2.50c	2.60c
500 Mexican.....	3.50c	3.60c
500 Opit.....	3.50c	3.60c
350 Overman.....	20c	25c
50 Sierra Nevada.....	2.65c	2.75c
250 Scorpion.....	55c	60c
250 Standard.....	2.05c	2.20c
700 Utah.....	2.50c	2.60c
350 Union.....	4.50c	4.80c
500 Yellow Jacket.....	2.65c	2.75c
AFTERNOON SESSION.		
600 Alpha.....	1.30	
85 Albion.....	90c	
450 Alta.....	40c	

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Navajo, March 19th, \$18,150; Yellow Jacket, 19th, \$7,600; Final Con., 6th to 14th, inclusive, \$11,645.91; Martin White, 14th, \$2,237.08; 16th, \$2,180.90; Northern Belle, 15th, \$6,308.10; 12th, \$8,036.49; Yellow Jacket, 17th, \$7,558.49; Bodie, 19th, \$7,035; Christy, 15th, \$4,306; Standard, 12th, \$19,028.65; Contention Con., 10th, \$20,415.33; Bodie Tunnel, 19th, \$2,518; Park City, 15th, \$3,720; Hanauer, 15th, \$4,264; Mammoth, 15th, \$3,063; Park City, 16th, \$1,500; Mammoth, 16th, \$2,955; Horn Silver, 16th, \$6,000; Frisco, 16th, \$4,139; Ontario, 17th, \$6,218; Horn Silver, 17th, \$9,000; Ontario, 17th, \$9,843; Hanauer, 17th, \$2,350; Stormont, 17th, \$3,300; Germania, 17th, \$2,260; Alice, 17th, \$6,266; Horn Silver, 18th, \$12,060; Ontario, 18th, \$6,187; Sullivanville, 18th, \$6,053.

Mining Share Market.

Business at the stock board has been very dull for the past week, and prices have been low. Yellow Jacket has been up and then down again. The cause of Yellow Jacket's upward flight and subsequent retrograde movement is a mystery. From the mine nothing of special change has been received. There are those, however, who believe that something important has occurred in the ore vein on the upper levels, which is being kept secret for the present by parties who are desirous of buying. The change in the Albion Con. management took place as was anticipated—Mr. Fish displacing Mr. L. L. Robinson as President. The latter received \$500 a month as President; the former receives \$50. The new Board of Trustees, it will be seen, have commenced to practice economy, and pay nominal salaries only.

WHILE in San Bernardino, says the *Semi-Tropic*, we were shown some very rich specimens of gold and silver bearing rock, that came from the vicinity of Twenty-nine Palms, by Thomas Lyons, of the European Hotel.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T SALE.	SECRETARY.	PLA.	OF BUSINESS.
Albion Con M Co.	Nevada.	13.	50.	Mar 6.	Apr 9.	Apr 30.
Andes S M Co.	Nevada.	21.	25.	Feb 6.	Mar 13.	Apr 2.
Argenta M Co.	Nevada.	15.	25.	Mar 20.	Apr 23.	May 14.
Bodie Con M Co.	California.	2.	50.	Mar 5.	Apr 16.	May 16.
California M Co.	Nevada.	7.	25.	Feb 27.	Mar 6.	May 4.
Day & Smith M Co.	California.	12.	100.	Mar 13.	Apr 16.	May 4.
Eureka Con M Co.	Nevada.	13.	100.	Mar 13.	Apr 16.	May 4.
Grand Prize M Co.	Nevada.	13.	100.	Mar 13.	Apr 16.	May 4.
Holmes M Co.	Nevada.	13.	100.	Mar 13.	Apr 16.	May 4.
Independence M Co.	Nevada.	10.	100.	Mar 13.	Apr 16.	May 4.
Justice M Co.	Nevada.	13.	100.	Mar 13.	Apr 16.	May 4.
Mayflower S M Co.	Nevada.	3.	100.	Mar 13.	Apr 16.	May 4.
Mexican G & S M Co.	Nevada.	22.	100.	Mar 13.	Apr 16.	May 4.
Savage Hill M Co.	Nevada.	55.	100.	Mar 13.	Apr 16.	May 4.
Silver Hill M Co.	Nevada.	13.	100.	Mar 13.	Apr 16.	May 4.
Silver Lick Con M Co.	Nevada.	2.	100.	Mar 13.	Apr 16.	May 4.
Tip Top S M Co.	Arizona.	5.	100.	Mar 13.	Apr 16.	May 4.
S Maguel & La Trinidad M Co.	Mexico.	1.	100.	Mar 13.	Apr 16.	May 4.
Utah S M Co.	Nevada.	43.	100.	Mar 13.	Apr 16.	May 4.

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T SALE.	SECRETARY.	PLA.	OF BUSINESS.
Excelsior W & M Co.	California.	4.	100.	Dec 28.	Mar 20.	Apr 12.
Excelsior Deep Grav M Co.	California.	21.	25.	Feb 6.	Mar 13.	Apr 2.
Fair Villa M Co.	Arizona.	3.	100.	Dec 11.	Mar 16.	Apr 2.
Loreto M & M Co.	Mexico.	3.	100.	Feb 6.	Mar 9.	Apr 9.
Mayflower Grav M Co.	California.	19.	100.	Jan 30.	Mar 12.	Apr 30.
Mount Auburn G & M Co.	California.	10.	250.	Mar 7.	Apr 10.	May 10.
McMillen S M Co.	Arizona.	5.	100.	Mar 3.	Apr 12.	May 10.
Napoleon M Co.	California.	7.	100.	Mar 13.	Apr 10.	Apr 23.
Omikak G & S M Co.	Alaska.	1.	100.	Feb 16.	Mar 23.	Apr 10.
Oro M & M Co.	Arizona.	2.	100.	Dec 28.	Mar 5.	Mar 29.
San Pedro M Co.	Arizona.	3.	100.	Mar 6.	Apr 10.	May 2.
Summit Hite G M Co.	California.	5.	100.	Jan 30.	Mar 3.	Mar 26.
Standard M Co.	California.	10.	100.	Mar 16.	Apr 30.	May 25.

MEETINGS TO BE HELD.

COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Jackson M Co.	Nevada.	D C Bates.	309 Montgomery st.	Annual.	Mar 26
Moonlight M Co.	California.	C E Gillett.	434 California st.	Annual.	Mar 26
Melones Con M Co.	California.	E M Hall.	327 Pine st.	Annual.	Mar 27
Phenix S M Co.	Nevada.	G Harte.	412 Jackson st.	Annual.	Apr
Virgin Con M Co.	Nevada.	A F Benard.	NE cor Howard & 6th.	Annual.	Mar 20

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bulwer Con M Co.	California.	W Willis.	309 Montgomery st.	65.	Mar 12
Contention Con M Co.	Arizona.	J C Bates.	309 Montgomery st.	25.	Feb 17
Kentuck M Co.	Nevada.	J W Pew.	310 Pine st.	10.	Mar 19
Navajo M Co.	Nevada.	J W Pew.	310 Pine st.	25.	Mar 13
Northern Belle M & M Co.	—	Wm Willis.	300 Montgomery st.	50.	Mar 15
Silver King M Co.	Arizona.	J Nash.	316 California st.	25.	Mar 15
Standard Con M Co.	California.	Wm Willis.	309 Montgomery st.	25.	Mar 12

Pyramid, New Mexico.

EDITORS PRESS:—This camp is located some nine miles southerly from Lordsburg, on the Southern Pacific R. R., and embraces many mines of much promise. Among which may be named the Last Chance, Viola, Miser's Chest, etc.

The event of the times in this part of the country is the starting up of the Pyramid Co.'s mill, which has been in course of construction for the past six months. This company is composed of eastern capitalists mostly from Rochester and Auburn, N. Y., who purchased about a year ago from Col. Green, the Viola mine. After a few months further work upon the property the development was of so favorable a character that the company decided at once upon the erection of a mill and contracted with the Pacific Iron Works, Rankin, Brayton & Co., of San Francisco, for a 20-stamp furnace mill, embracing all their latest improvements.

The contract for construction was given to J. W. Pender, a mill builder of large experience, under whose immediate supervision the work has been constructed. The mill is a splendid specimen of work, no expense having been spared either in material or construction, and it is conceded by all our experienced miners to be the most perfect and complete in all its appointments of any now running in Arizona or New Mexico.

The machinery, like all that turned out at these works, is of the latest and most improved construction, designed especially for the thorough and economical treatment of base ores, and consists principally of a 100 H. P. Wheelock automatic cut-off engine, and boilers of like capacity; a 20-stamp dry crushing battery, furnished with self-feeders, elevators and conveyors; a 60-inch Howell chloridizing furnace, with Pacific revolving dryer; 10 five-foot combination pans, 5 eight-foot settlers, retorts, melting furnace, quicksilver elevators, crusher, grizzlies, etc., including all other appurtenances of a first-class modern mill.

So far as it has been run the capacity is considered much beyond that of other mills on this class of ores, while the ore is being worked up to 96 per cent. of its assay value.

This is considered by the most experienced mill men the best results yet obtained on ore of so base a character, and is evidence of the superiority of the work and thoroughness of construction. The building of this mill has given a great impetus to mining in this vicinity, and large shipments may be looked for from this camp within the next 12 months. H. A. W.

Pyramid, New Mexico, March 19th.

Meetings and Elections.

ALBION CON. M. Co.—March 17th. Directors—S. Heydenfeldt, Charles H. Fish, Henry T. Scott, P. A. Wagner, Julius Jacobs, A. J. Ralston and Samuel Hart. Charles W. Fish was elected President, and A. W. Havens, Secretary.

CHOLLAR M. Co.—March 21st. Directors—A. K. P. Harmon (President), C. L. Weller (Vice-President), Wm. Norris, J. D. Fry, J. H. Robinson, W. E. Dean (Secretary), Isaac L. Requa (Superintendent).

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANES, State Mineralogist.]

CATALOGUE.	DESCRIPTION.
4726.	Basaltic Column—Giant's Causeway, Antrim county, Ireland. J. Z. Davis.
4727.	Mountain Leather—A variety of Amphibole, found 18 feet below the surface, near Pine Grove, Amador county, California. (See 4726.) J. Z. Davis.
4728.	Arrow Heads of Yellow Jasper—Tehachan mts. near Tammam Parish, Louisiana. J. Z. Davis.
4729.	Grotesque Figure in Baked Clay—Made by the Indians living on the banks of the Gila river, Arizona. J. Z. Davis.
4730.	Cardium Corbis—post tertiary Fossil, Sequoia, Santa Cruz county, California. J. Z. Davis.
4731.	Co. cretions of Limonite—Found near Pine Grove, Amador county, California. (See 4726.) by their external appearance they are coprolites (No. 433), which are the same, were so labeled. J. Cooke.
4732.	White Marble—Glacier Bay, Alaska. Frank Taghlin.
4733.	Indian Implements of Baked Clay—With human bones found in an Indian mound five miles from the Dalles, Oregon. D. Morgan White.
4734.	Silver Ore—Sunrise mine, Taylor district, White Pine county, Nevada. J. R. Ryan.
4735.	Silver Ore—Contains native silver in Calc Spar and Barite—San Gabriel Canyon mines, San Bernardino county, California. Charles M. Tyler.
4736.	Rich Silver Ore—King mine, Calico district, San Bernardino county, California. Charles M. Tyler.
4737.	Rich Silver Ore—The Eva mine, Calico district, San Bernardino county, California. Charles M. Tyler.
4738.	Silver Ore—Oriental group of mines, Calico district, San Bernardino county, California. Charles M. Tyler.
4739.	Silver Ore—Burning Mesquite mine, Calico district, San Bernardino county, California. Charles M. Tyler.
4740.	Silver Ore—Occidental mine, Calico district, San Bernardino county, California. Charles M. Tyler.
4741.	Silver Scales from a cave near the Silver King mine, Pine county, Arizona. J. Holmes.
4742.	Fossil Leaves—Coal mines, Carbon Hill, Washington Territory. D. Morgan White.
4743.	Silver Ore—Run over mine, Calico district, San Bernardino county, California. W. H. Raymond.
4744.	Quartz with Gold—Electrum—Bodie mine, Mono county, California; very rich in gold, examine carefully. J. M. Claassen.
4745.	Silver Ore—Bonanza King mine, Slate range, 1100 feet above California. J. M. Claassen.
4746.	Azurite, Malachite and Cuprite—Kerrick mine, Banton, B. d. Springs, Mono county, California. J. M. Claassen.
4747.	Chromite—100 lbs. mass of Chromite, Del Norte county, California. J. M. Claassen.
4748.	Silver Ore—Non-ten B. mine, Esmeralda county, Nevada. J. M. Claassen.
4749.	Variegated Obsidian—East of Mono lake, and three miles inside the State of Nevada, Esmeralda county. J. M. Claassen.
4750.	Volcanic Tuff, so-called White Lava—A similar rock is used in building ovens for bread baking (see No. 4751). Found near Ktna Springs, Napa county, California. C. Hartson.
4751.	Volcanic Tuff—Used in Europe in building bake ovens. It has the property of retaining the heat imparted to it by the fuel. River Rhine, Germany.
4752.	Native Copper—Five miles west of San Luis Obispo, California. Theo. G. Bilty.
4753.	Nickel Ore—Sa'd to be found in San Benito county, D. Morgan White.
4754.	Croppings—Manzanita gold mine, Sulphur Creek, Colusa county, California. (See No. 4753.) Charles M. Tyler.
4755.	Blumens Stone, or Impure Limonite—Near Mt. Diablo, Contra Costa county, California. Volatile matter, including water, 25%; fixed carbon, 17.6%; Ash, 58%; total, 100%.
4756.	Silver from cupels copper-smelting furnace, Pelton, Pluma county, Arizona. H. M. Howe.
4757.	Copper Matte with Metallic Copper. James C. Weir.
4758.	Aragonite—Ranch of J. M. Pugh, near Smithville, Colusa county, California. W. H. Wilson.
4759.	Rich Ores—Partzite, native silver, galena, etc.—Tower mine, near Benton, Mono county, California. J. M. Claassen.

COMPTROLLER KNOX will shortly pay to the depositors of the Freedman's Bank another and final dividend of seven per cent. out of the remaining assets of that insolvent corporation. Dividends amounting in the aggregate to 65 per cent. have already been paid.

DO NOT be deceived. Insist on having the genuine Brown's Iron Bitters, made only by the Brown Chemical Co., and take nothing else.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

AMADOR

PURCHASE.—Amador Ledger, March 16: A report has been circulated to the effect that A. Hayward was likely to purchase Nevill's famous mine near Middle Bar. We understand that negotiations have been in progress with a view to the purchase of an interest in the property, but not in behalf of the capitalist named. Mr. Nevill expects to get the mill running in the course of a few days.

THE Bunker Hill mine resumed operations in the early part of the week, and the prospects are reported to be very encouraging, the quality of the ore perceptibly improving.

THE personal property belonging to the Mahoney Co., held under attachment, was sold by the Sheriff on the 13th. It was bought in by Werner & Sutherland, in behalf of the attaching creditors, for the amount of judgment and costs—about \$1,000.

THE Tellurium mine and mill near Pine Grove was attached this week, for claims aggregating over \$1,600. The late employees have commenced filing liens against the property.

FROM PLYMOUTH.—Gentlemen representing the Salt Lake M. Co. were in town last week, and left Sunday morning for Fairplay, in which vicinity they lately purchased two mines. They returned in the evening, and left, Monday, for San Francisco, apparently well pleased with the prospects of the section they visited. A. J. Burnett has struck another ledge on his property at Fairplay, which seems to be in the nature of a pocket claim. One day this week, he dug a hole, and found a small piece of rock, which yielded \$14.50 in gold. There is considerable interest being taken in the mining resources of Fairplay and neighborhood. A San Francisco company had an expert up here one day last week, in company with A. J. Burnett, who also seemed satisfied as to the mineral wealth of that region.

EL DORADO.

GOOD PROSPECTS.—Mountain Democrat, March 16: We hear highly favorable reports from the Polar and White Bear mines, at Henry's Diggings, both of which are under the management of Superintendent C. H. Watt, formerly of Sacramento. The ledges are large and strong, and give very flattering prospects.

FINE GRAVEL.—At Henry's Diggings, in the bank adjoining the Carrie Hale gravel mine, of which latter J. H. Bradley is superintendent, Roberts & Armstrong have been sluicing for some weeks in gravel, some of which has yielded as high as \$8 to the pan. The owners claim that they have \$20,000 or more in sight.

THE EL DORADO MINE.—This mine, formerly the Last Chance, is located on the north side of the Cosumnes river, opposite and on the range of the Crystal mine, and is owned by J. and M. McEvoy, O. F. Eaton, F. Davidson and B. C. Fuller, all residents of that neighborhood. They are opening up in good shape, have a large and strong ledge exposed, with a number of rich chutes, and will probably have a five-stamp mill up within the next 60 days. Superintendent Alexander, of the Crystal mine, has opened up a strong ledge of fine looking ore, and the future success of the mine is assured.

D. A. CLINE was up from Shingle Springs, Thursday, and says that within the past few weeks a large amount of fine machinery—the finest he has ever seen brought into this county—has been received at that place, to be used on Joshua Hendy's mine, at Nashville, the far-famed Havilah.

THE "COUSIN JACK" MINE.—This mine is situated at Henry's Diggings, 3½ miles from Grizzly Flat. It is owned by San Francisco capitalists, and the property is managed by C. J. Eaton, Superintendent, who has had charge of it since August, 1882. At that time the top tunnel was in 75 ft, with a 14 inch ledge of good pay ore. In sinking 40 ft the width of the ledge increased to an average of about 2½ ft and the ore improved in quality. The middle tunnel was then in 140 ft, and has been extended until it is now 325 or 330 ft in length, with a ledge that will average 14 inches thick the whole distance. Two "uprisers," of 40 ft each, have been made showing a ledge of 14 inches, some of which assayed away up in the thousands. In this tunnel, at a distance of 150 ft from its mouth, a winze has been sunk 75 ft, at which depth the ledge is 2½ to 3 ft thick, solid between well defined walls. The upper is 125 ft above the middle tunnel, and

STARTED UP.—The Lasky mill at Beveridge is reported to have started up last Thursday. We trust its period of grinding the gold out of the mines of that district may be extended for many years to come.

MARIPOSA.

INDIAN GULCH.—Mariposa *Herald*, March 16: We are building a large quartz mill here for the Gonzales M. & D. Co. The size of the mill will be when completed 32x78 ft, more than one half of which is now completed, and the machinery is nearly all in position, and in two weeks can be set in motion. The process of working the ore is M. B. Dodge's patent, consisting of a rock breaker, one pulverizer, elevator and screens, amalgamators two wet concentrators, and two dry concentrators. Mr. Dodge, who is an old miner and prospector, has given this process years of careful study, and for two years past has spent time and money in perfecting and improving it until it is as near perfection as may be, and he will guarantee to work all rebellious ores and save all the precious metal contained therein. Our superintendent, Mr. F. T. Houghton, has selected this process after careful investigation, and from his mining experience his judgment can be relied on.

MONO.

TRUE DEVELOPMENT IMPROVING.—Candelaria *True Fissure*: A resident of Clover mining district, Mono county, was in town this week, and speaks very highly of the present appearance of the Wild Rose mine. The management feels highly encouraged with the result of the prospecting now being done, and anticipates making good bullion returns for the past operations, and the coming summer's work. Quite a little village is being built at the mouth of the tunnel which includes a store, containing only the more essential articles required by the employees, of whom there are now fifteen. A town site is thought of, and will probably be located in the little valley or canyon just below the ore dump. The district has about 50 or 60 men in it already, and appearances indicate there will be a hundred before the first of May. The lumbermen are becoming active so early in the season, but now engaged in overhauling the machinery at the sawmills. Two new mills are talked of, for the purpose of cutting the excellent timber in the near vicinity, and to the southward, for use as ties in building the Carson and Colorado railroad, and other purposes.

NEVADA.

NEW QUARTZ MINE.—*Herald*, March 18: The Reward is the name given to a quartz ledge situated on the Rifle grounds, about a half mile from town. Work has been in progress about six weeks and during that time two shafts, each 70 ft in depth, have been sunk upon the ledge. A 90 ft drift connects the shafts. From the bottom of the new shaft a drift has been run off nearly a hundred feet, and a ledge of good looking rock uncovered, the vein matter being from 10 to 12 inches thick. Free gold can be seen in many places of the ore and the sulphurets contained in it of good character, although the quartz does not as yet carry any great amount. It is thought that as the ledge is developed and a greater depth attained, the rock will become more heavily charged with sulphurets. Two whipsays are at present used to do the hoisting. A crushing of rock will be had in a few days, when the prospects of the mine will be better known. S. R. Williams and B. C. Walrath, of this city, are the owners of the Reward. Eight men are employed in the mine.

DULL TIMES ON THE RIDGE.—*Grass Valley Union*, March 16: A gentleman who, within a few days, visited nearly all the towns on the Ridge, from French Corral to North Bloomfield, says there is a general complaint of dull times, which are likely to remain so through the summer season as the water supply for mining is certain to be a short one under the most favorable circumstances, as there is but little snow in the mountains, and any snowfall that may come at this time of the year will not furnish water any great length of time, as it will melt off too quickly. For the snow to be of good service in furnishing a summer supply of water there must be a good foundation for the first snowfalls of the season which have solidified into ice, and then the new furnished by the late or spring storms will remain until the heats of summer come on. Some of the large hydraulic companies, which own their own canals and reservoirs, will have water sufficient to last probably as late as August, but companies that are companies that are compelled to purchase water will hardly be able to work later than the first of June, if so long. The present season to all appearances, will not be generally profitable to the hydraulic mining business.

PLUMAS.

GREEN MOUNTAIN.—*Greenville Bulletin*, March 14: It is very fortunate that power enough should be supplied to keep the air compressor running without interruption; good progress is being made in the tunnel, the average daily advance being fully eight ft. The flow of water in the face of the tunnel has increased during the past week. This does not hinder the work any, but adds to the discomfort of the workmen. A very agreeable change is apparent in the atmosphere of the tunnel since the fan was started. After a round of holes has been exploded the air at the face is now quite clear in a few minutes, so that but little delay in resuming work is caused by the smoke. At the mouth of the tunnel a new building has been erected, covering the entrance, the fan and water wheel, and also the blacksmith shop under one roof. This was done to prevent delay or hindrance from snow.

TAYLOR-PLUMAS.—The drift running east from the winze is now in about 70 ft. As was anticipated, the ledge has improved as it is opened to the eastward, and at present is fully five ft wide. The ore looks very well, the foot and banging walls are well defined, and this part of the mine gives all indications of opening up a fine body of ore. The present method of getting out this ore is slow and expensive; it has to be carried to the bottom of the winze in a wheel barrow and there hoisted up to the tunnel by hand. As an improvement on this Mr. Bransford proposes to sink direct on the ledge from close to the mill and take power from the driving wheel to do the hoisting. This would reduce expenses very much, and open up a far larger ore body than can be economically worked from the present drift.

NEW SHAFT.—Work has already been begun on a new shaft at Crescent. The ground on which the shaft is located was taken up by C. H. Higby as an extension of the Crescent mine, and it is said that

the owners of that property will claim the ground as part of their original possessions. Should this prove to be the case, a lawsuit will be the result, as back of Mr. Higby there is money and grit, while the owners of the Crescent mine are lacking in neither. The lawyers are very lucky in mines; true, they toil not in them, yet nearly every good strike in mining is a bonanza for them.

SHASTA.

LOWER SPRINGS.—*Shasta Courier*, March 16: C. S. Jones and his father have become interested in the White mine, at Lower Springs, and have gone to work with energy and determination to fully develop this promising claim. Ore taken from the mine and worked at Waugh's anastara, yielded an amount that showed that works on the claim would result in obtaining very handsome returns. We understand that parties, "well heeled" financially, are preparing to put machinery on the ground and work the quartz in good shape. Seventeen years ago Peck & Peart put up a "coffee mill" there and scraped around a little in the quartz and "busted up." The "Little Devil" quartz mill was also tried, the machine which D. D. Harrill offered to bet he could beat cracking quartz with his teeth, but that machine was soon taken away in a wheel-barrow. There is no doubt in the world but what the Lower Springs quartz ledges will pay well when properly worked. Their depth, extent, and the yield obtained by the anastara working process, attest that they are good mines and fully justify the prompt expenditure of capital in their further development and practical working. We hope that the time has now come when Lower Springs quartz ledges are to be treated and valued at something like what their undoubted merits warrant.

SIERRA.

A NEW LEDGE UNCOVERED.—*Sierra Tribune*, March 16: A fine looking ledge that carries gold was recently uncovered on the Harlem M. Co.'s ground. This was a blind lead, and its existence was hitherto unknown. It promises to be a very important find and we shall have something further to say regarding the matter at an early date.

THE MARGUERITE MINE.—*The Marguerite* quartz mine, in this county, during the month of February, yielded \$25,600 worth of bullion, \$15,600 of which, we understand, was extracted in 14 days.

STRUCK GRAVEL.—Last Saturday a telegram was received from Superintendent Lawry saying that gravel had been encountered in the Bald Mountain Extension mine. L. Nessler visited Forest City on Monday. He reports that there is a big excitement in that town over the strike. The owners are in high spirits, and express the opinion that the assessment period is past.

Nevada.

CHERRY CREEK DISTRICT.

WITHOUT A PARALLEL.—*White Pine News*, March 17: It is no uncommon thing to see mining companies close up, in most instances pay up, but in some few cases go into insolvency, and quit business for good. In all such cases, however, the property they have been working has proved valueless, and the stockholders got tired of "putting up," when they saw no hope of finding ore. But it has been left to the Star Company to be the first to commit financial suicide in the very presence of open prosperity. With a mine that has yielded over \$3,000,000 in the past five years, with no machinery to speak of, with poor management, and prospected barely below the grass roots, it is no wonder that the managers have not been able to make fortunes out of it. But, notwithstanding all this, the Star mine to-day looks better, has more ore in sight, and promises better than it has at any time since it was opened. It looks both silly and wicked to abandon such a property. We feel certain it will not be abandoned for any length of time. The folly of its owners can hardly go to such an extent, for mining properties like the Star are not to be found every day, and the petty spite of its managers can hardly go to the extent of laying idle one of the best mines in the State.

COLUMBUS DISTRICT.

NORTHERN BELLE.—*True Fissure*, March 16: This mine has developed some changes of importance during the week. A distance of 12 ft has been made in extending the cast drift from the bottom of the main winze, from the fifth shaft level. It is now 22 ft in length, the face being still in quartz giving low assays. Crosscut No. 2, on the same level, shows small streaks of sulphurets yielding assays of \$30 per ton. Everything is running smoothly at the hoisting works, and all the other work is progressing well. The daily output of ore has been about 60 tons, which mill No. 2 continues to handle easily, and is doing good work meanwhile. The bullion shipments amount to \$13,344.59 for the week ending March 15th, with a total of \$24,127.34 on March account to the same date.

MOUNT DIABLO.—A small amount of \$65 ore is being stopped from the drift connecting winzes Nos. 1 and 2. Lower winze No. 2 is showing 18 inches of ore assaying \$70 per ton, at the point where the slope is being extended easterly. A slope has been started from this winze 60 ft below the third level, and has developed 15 inches of \$90 ore in ground that looks encouraging. Small amounts of ore are taken from the slope from the drift on the first intermediate level, the first level and from the Mount Diablo adit.

EUREKA DISTRICT.

AN OLD PROSPECTOR IN LUCK.—*Eureka Sentinel*, March 16: It is not often that we feast our eyes on native silver from the mines of this district, but yesterday Mike Lyons came in from the Dugout mine on Prospect Mountain with two beautiful specimens containing very silver that he had taken from near the surface. He says that there is more of the same kind to be found, and has promised to bring in a nice specimen in a few days to place in our cabinet. The history of the Dugout mine is such that had it been situated anywhere in Colorado the newspapers of that State would be teeming with glowing accounts of it. Mike Lyons worked at the Richmond furnaces a few years ago, but was stricken with lead colic and compelled to go to San Francisco for a change of climate. As soon as he recovered his health he obtained employment at the C. P. R. R. freight depot, but, pining for his old haunts, returned to Eureka, and, unable to find employment, commenced prospecting. While so employed he discovered some good looking float rock at the western base of Prospect Mountain, near where it

joins the Spring Valley range. He traced out the ledge, and, with Paddy O'Keefe as his partner, commenced running an open cut up the side of the hill. Their painstaking was well rewarded. They have since shipped to the furnaces enough ore to keep them comfortable for several years, and now have one of the very best mines on Prospect Mountain.

NOTES.—*Eureka Sentinel*, March 16: The Eureka tunnel ore bodies are holding out nobly. There is room for two or three more good tunnel enterprises on Prospect mountain. The Kirby Hill tunnel is looking very well, the face being in very favorable rock for ore. Orders are daily expected from the Silverado M. Co. to resume work upon their mines at Silverado. The number of miners that have commenced leasing mines on Prospect mountain would make a small army. There are more men employed there than ever before in the history of the camp. This speaks well for Prospect mountain mines. Messrs. Waters & Co. are hard at work in the Geraldine tunnel, which they are running to connect with the old incline of the Grant mine. They have had a lease of the property for several months past, and are sticking faithfully to their undertaking. The prospects are that they will be handsomely rewarded.

PINTO DISTRICT.

PROSPECTING.—*Eureka Sentinel*, March 16: There are several prospectors now searching for mines on Silverado, Dome and Sugarloaf mountains in Pinto district. A fine streak of ore has been discovered in the croppings of the Berryman tunnel claims, on Silverado mountain, Pinto district. M. H. Joseph and others have located some valuable claims in Pinto district, near Alhambra Hill. They have taken ore from the croppings that gave fair assays in silver and carrying a large percentage of copper.

SANTA FE DISTRICT.

A RUSH FOR COPPER ORES.—*Candelaria True Fissure*, March 16: Santa Fe district is fast opening a large area of copper mining. There are a great many prospects in that section of the country, nearly all of which are being worked more systematically and energetically this season than at any previous time. Some very pretty specimens were brought in this week, and very flattering accounts are told of quite a number of fine looking properties. Several smelters will necessarily have to be erected at an early date, each of which will cause more search to be made for copper ore, and assist the settlement of this fast becoming noted mining section of Nevada.

WILLOW CREEK DISTRICT.

THE SILVER WAVE MILL.—*Silver State*, March 14: The Silver Wave mill, at Willow Creek, is now running steadily and doing good work. J. E. Bernard, who arrived here yesterday from the Willow Creek mines, says the mill is crushing from 10 to 12 tons of ore daily. It is working ore from the Iowa mine. Elias Jones has one of his large teams hauling ore from the mine, which is about three miles from the mill, and unless the roads get very bad from late storms, there will be no trouble in supplying the mill, as there are some 200 tons of ore on the dump at the mine, and the mine is in a condition to keep up the supply for an indefinite period.

New Mexico.

MINING NOTES.—*Southwest Sentinel*, March 19: The Solid Silver M. Co. during the past week have received two wagon loads of very nice ore from their 80 ft level on the Black Hawk claim. The Colossal claim, owned by William Eckels and others, at 45 ft shows a 12 inch streak averaging 200 ounces silver. Parties from the East are examining the property with a view to buying. A very rich discovery of mineral was recently made in the vicinity of Bald mountain comprising a group of twelve claims. They lie about three miles northwest of this mountain, on the north side of a canyon known as Silver Gate, and about midway on a straight line between Bullard's Peak and Silver City. The Modoc and Phumas, two of the claims, on account of the great quantity of rich float and the richness of the croppings, has created quite a ripple of excitement among the miners of that section of country. It is called the "California" group. Two veins have been discovered on the Modoc, one running from 6 to 14 inches in width, and the other varying from 20 inches to 4 1/2 ft. The ore is a rich gray carbonate, stained with copper, and from a series of assays made from the croppings and near the surface, \$50 per ton in silver has been obtained and 40% in lead. We are assured that this is the average. A few feet from the top of the croppings large kidneys of horn silver and silver glance was discovered, which yielded an average of \$800 per ton by a number of careful assays. Several large pieces of float, about two feet from the surface were also found of immense richness, going high as \$20,000 per ton. Competent judges, who are disinterested, say that car loads of this float may be gathered on this claim. The 4 1/2 ft vein prospects \$20 per ton. On the Phumas claim a streak of rich carbonates has also been discovered, similar to that on the Modoc. There is a lace of 18 inches of rock on the claim carrying rich horn silver. On the crest of Telephone hill near by, is a contact between quartzite and granite, and the most noticeable feature is that every vein in the camp runs towards this contact. The properties are all surveyed. J. L. Holland, John M. Wright and the Dorsey Brothers are the owners. Specimens of the ore on exhibition at the office of McComas & Wright are marvelously rich.

A BIG MINING SALE.—*Southwest Sentinel*, March 14: Yesterday Mr. Clayton, a mining capitalist of Minnesota, purchased Wm. Dorsey's one-third interest in the Mother Lode group of claims in the Telegraph district, this county. The group comprises eight claims. Eighteen thousand dollars in cash was paid. The owners now are Mr. Clayton, one-third; C. P. Crawford, one-third; Newton Bradley owning the remainder.

MINING ITEMS.—We saw ore taken from the Mule mine at Pinos Altos, Monday. It is a fine, rich carbonate, carrying a large percentage in lead and assays well in silver. Embedded among the beautiful white quartz crystals may be seen particles of free gold. The claim is a promising one, and is liable to develop a bonanza. R. V. Newsham and others are the owners. W. C. Ross is taking out a large amount of high-grade silver ore from his mine in the Bald Mountain district, and will send it to John R. Magruder's smelter, on the Ivanhoe mine,

for treatment. C. P. Crawford, M. B. Hayes and R. B. Higbee have given a working bond on the Peacha, Surprise and Mountaineer mines to C. W. Watson and James Van Dyk. Consideration \$10,000. Messrs. Watson & Van Dyk will commence work at once with a good force of men. Watson was formerly superintendent of the Homestake mines in the Black Hills, and Van Dyk is also a man of ripe experience.

Utah.

REVIEW.—*Salt Lake City Tribune*, March 17: Another week of remarkably fine and clear weather has passed; it has been quite favorable for the handling of the metals. The receipts of bullion for the week ending March 15th, inclusive, were \$165,848.36, against \$154,286.41 for the previous week. The shipments for the week ending March 10th, inclusive, comprise 41 cars of bullion, 1,051,882 pounds; one car lead, 24,176 pounds, sent west; one car copper ore, 20,000 pounds, and five cars copper matte, 102,500 pounds, sent to Colorado; making a total of 48 cars, aggregating 1,198,558 pounds. The output of the Horn Silver for the week amounted to 22 cars valued at \$66,000. Yield of this company previously reported for the calendar year, 1882, \$685,500; present aggregate, \$751,500. The Ontario shipments for the week were 40 bars, of the value of \$40,920.50, as compared with \$35,051.16 for the previous week. There is nothing new with this company. The exploiting work goes forward steadily, and when completed will very materially add to the productiveness and ease of operation of the property. It was said during the week that the impassable condition of the roads had stopped the shipments of ore from the Crescent mines, and that in consequence the Park City smelter had shut down. This must have been but temporary, for that smelter is in full blast again, and reports for the week an aggregate of five cars of bullion, valued at \$9,260. It is hoped that hereafter the product will be continuous.

WASHOE DISTRICT.

MEXICAN.—*Enterprise*, March 18: The joint Union Con. east crosscut has been extended 24 ft. On the 3100 level the joint Ophir east crosscut has been advanced 21 ft.

OPHIR.—On the 3100 level the joint Mexican east crosscut has been extended 21 ft. Are repairing the bob station in the vertical shaft. Are again extracting ore from the croppings.

SIERRA NEVADA.—On the 2000 level the north lateral drift has been extended 25 ft. The joint Union east crosscut, on the same level, has been advanced 28 ft.

Idaho.

TARIFF ON ORE.—*Wood River Times*, March 14: The Hailey sampling works started up two weeks ago with a large reserve of ore on hand or contracted for; but it may not run very long as, at the present rates, it is unprofitable to ship ore out of the country. The freight from Shoshone to Omaha is \$30 per ton; Hailey to Shoshone, \$10; sampling, \$5; hauling to sampler, \$5; working charges at Omaha, \$20; loss, percent, equal to about \$10 per ton; total cost of reducing ore to bullion, \$80; add cost of extraction say, \$10; total cost of bullion in ore, \$90. In order to secure any profit to the shipper the ore will have to carry over \$100 worth of metal. None but the very richest ore will average that high, anywhere else than on Wood river; and in this section the average has been kept up to 130 ounces silver and 65% lead, the past three years, only by the most careful selection. Unless the tariff to Omaha is reduced at least \$10 per ton, it will greatly retard the development of this section, and render the shipment of our second and third-class ores impossible, unless our producers accept the contract offered them by the heaviest Philadelphia smelters last year, to wit: A rate of \$13 per ton from Kelton to Philadelphia, via the C. P. and S. P. roads.

THE SOLACE MINE.—Supt. Childs, of the Solace M. Co., in Vienna or Smiley gulch, in the Sawtooth range, came down two or three days ago, to have a brief change from snowbanks and desert ravines to bare ground, open flats, and civilization. Although rather reticent on the subject, he states that the Solace is opening up much better than he expected when he assumed charge, and believes that he will show a good mine this summer. The mountains around Vienna are now covered with 10 to 12 ft of snow; but it is settling and melting fast. As soon as the weather permits, Mr. Childs will start work on the 12 other claims which his company owns, in Vienna gulch, and some of them will doubtless be found to contain bodies of good ore, as they carry very promising croppings.

Oregon.

NOTES.—*Jacksonville Times*, March 16: The weather still continues unfavorable and there is not much prospect for a good run this season. Welch & Ross are engaged in prospecting the Barkdell ledge and are sanguine of good prospects. C. J. Howard returned from Josephine county this week, and reports miners doing comparatively nothing. Judge Hanna and Henry Klippel, Esq., went to Josephine county, Wednesday on business connected with their mining locations in that section. McKee & Dews of Forest creek are able to run about five hours daily with their hydraulic. Klippel & Keaton on Poor-man's creek are not so well favored with water. Much prospecting is still going on in southern Oregon, which will yet prove the best mining region on the coast. Several prospectors from abroad are in the vicinity at present. Mr. Thompson is still at work in Gold hill and is going down on ore that seems rich in iron. The walls are well defined and he hopes to yet strike a ledge rich in gold. The tunnel is now 150 ft long. The ore from the Wallace ledge yields very little, but McDougal & Kahler's dump near Fort Lane is yielding an ounce to the ton. The latter ledge will probably prove an excellent one, as also may some others in the vicinity. R. W. Derickson of Horsehead, Josephine county, was in town this week. He informs us that he has a large amount of ore on the dump yet, after crushing which he will clean up and make different arrangements as to working the mill. Bybee & Co.'s ditch near Waldo, built last summer, does not fulfill their expectations, and it will have to be remodeled. Consequently, they have not been able to do much work this season; but what they have done establishes the value of their mines.

Reese River Pioneers.

Many of the original locators and developers of the mines are here yet, and many of them will die and be buried here. Your genuine Reese River pioneer is decidedly a peculiar character. He was a pioneer of California as well, therefore was among the first to join in the rush to "Washoe," and soon after to Reese River. He never was able to shake off his old California miner style, and would rather live in a cabin and work at "chloriding" and "tributing" for himself, at merely living rations, than to work for anybody else for good, regular wages. Therefore it is that he is found working "on tribute" or contract in these mines to-day, for, of course, he sold out his old locations, or was frozen out of them, long ago. He still goes out in the hills prospecting occasionally, but the whole country has been so closely scoured over and investigated that his new discoveries are exceedingly rare. Old Jim Sloggers, who is a standard member of the society of Reese River Pioneers, and who declares that he was with old Reese himself when he discovered Reese river, is the most inveterate of them all. Whisky could not kill him, but has only preserved him, as it were, and he frequently sweats that when he dies the worms in the little graveyard below town will go on a three-months' jamboree. The fine, spring-like weather of the last few days stirred up the old fellow's ambition, and he went prospecting over about Yankee Blade. Yesterday he came home and got drunk.

"Struck it again!" roared he, as he tacked ship and stood his course up street, stopping every few rods to shake hands with sympathizing friends, and tell them about it. "Struck the bulkiest kind o' chloride, richer'n Limburger a foot thick, betcher ribs."

"Glad to hear it, Jim, and now see that you hold on to a good thing for once in the way, and don't let anybody enslave or freeze you out of it."

"Ha, ha! freeze me out, hey? Git ahead of old Jim Sloggers some more, will they? Not much. Got 'em this time. Located the whole dam racket myself, and goin' ter work it myself. Hain't go no thiev'in' partners this time, and don't want none."

Then the old boy wore ship, and heat to windward for his little cabin on the hillside, chuckling occasionally as he felicitated himself on that last proposition.

Col. Dave Buel was among the first of the Reese river pioneers. He laid out the town site and built the first mill. The town was named after his partner, Alvah C. Austin, a native of Plymouth, Mass., who was here with him, but who is now a partner in the Miners' foundry, San Francisco, and resident of that city. By the way, Jack Williams, the famous desperado, so well remembered in the early days of the Comstock, and who was assassinated one evening in Pat Lynch's saloon, on B street, was also from Plymouth, Mass.—*Cor. Enterprise.*

AUSTIN.—A correspondent of the *Enterprise* says: The mill of the Manhattan Company continues grinding right straight along, and grinds exceedingly fine, its present run, which commenced on the 30th of October last, being one of the longest and most lucrative it has yet experienced. About every other day it sends forth its regular shipment of silver bullion—ten bars, worth \$1,000, or more, each. The average of the ore crushed at the previous run of the mill, last Summer, yielded an average of \$350 to the ton. The ore of the present run is not quite as rich, but there is more of it, the mines showing and developing better and more extensively than was anticipated. The monthly pay-roll of the company is about \$23,000, employing many miners at the regular rate—\$4 per day—and the tributaries are generally doing well. The mining and milling operations and other business matters of the Manhattan Company are exceedingly well managed and judiciously conducted in every respect. Notwithstanding all this apparent prosperity, however, there is much grumbling about hard times. This complaint comes principally from the business men. They openly declare that although their customers have plenty of work at good pay, they do not come forward and square up their accounts as they should. The tributaries, especially, they say, run long credits and big bills, and cannot always be depended upon to cash up. When they are in bad luck, they naturally are not expected to pay. Meanwhile, good paying customers have to make up for the poor ones, otherwise the storekeepers would soon necessarily be bankrupt. This idea or principle is not new, however, here or even on the Comstock.

JEFFERSON.—A correspondent writing from Jefferson to the Belmont *Courier*, says of the prospects of that once lively burg as follows: The work of repairing the mill is rapidly pushed ahead, and the stamps will probably be dropped by the 20th of this month. Sufficient ore can be taken from the different properties under the control of the Jefferson S. M. Co. to keep the mill running for several months without further prospecting being necessary. Several additional hands were recently employed, and, unless the almost undeniable proofs play us false, brisk times cannot be far distant. Jefferson is indeed brightening up, and bids fair to soon again occupy the position that she did years ago. At any rate, we live in hopes. It is whispered that the whistle will soon again be heard tooting from the Prussian hoisting works. If the rumor proves correct, our little camp will dance to lively music.

Divers for Mining Work.

The *Engineering and Mining Journal* says: We are indebted to R. J. Frecheville, of Truro, for the following account of the first diving operation of the kind carried out in a Cornish mine: The heavy and almost incessant rains during the winter have so increased the water in the Phoenix United mines, Liskeard, that it has risen above the plunger pole, which is situated 200 fathoms from the surface. After the plunger had been working some time under water it failed to work satisfactorily. Soon after it was discovered that it required to be packed, and the question arose as to how the obstruction was to be removed, there being from 10 to 20 feet of water above the top of the pole. The manager and agents held a consultation, and decided to engage the service of a diver. This course was generally approved in the mines and was accordingly adopted. At first one diver and his assistant came to the mines and prepared themselves to perform a piece of work underground which they had never before seen. They, however, determined to make an attempt in a vigorous

The Paradise Mines.

Reports from the Paradise mines are of a highly encouraging character. Ed. Hewitt says that the Bullion of Paradise Co., in extending their drift north from a 72-foot winze, below their present tunnel level, discovered, almost unexpectedly, very rich ore. This development is of more than ordinary importance, as it shows that the rich chute of ore in the north end of the mine continues down to an indefinite depth, and as the ore body is known to be about 90 feet in length, and in several places above from 16 to 20 feet in width, it is deemed quite probable by mining men that there are equally large and rich bodies of ore where the drift is being run. There is a winze down in this chute, or chimney of ore, 14½ feet, which the company will now sink and connect with the drift above mentioned, and they will then be prepared to rapidly, and at small expense, stoop out the ore. It is gratifying to learn that the much neglected Paradise mines, which experienced miners say have every indication of being rich and permanent, are, through

Mineral Lands.

The C. P. R. Company, owners of the California and Oregon franchise, claim each odd or alternate section of land for 20 miles on each side of the located line, and when alternate sections are occupied by prior claimant, they claim the privilege of floating to the 30-mile limit. Thousands of acres of this land is mineral in character, containing known and hidden quartz and gold deposits, and being unoccupied or sparsely settled may be confirmed to the railroad without giving Government or other party notice to investigate its mineral character. The company have no right to mineral land but will take it fast enough whenever they get a chance. The only way for miners and the friends of the Government to prevent wholesale railroad grabs of mineral land in Shasta county is to organize and club together, as the miners did in this vicinity several years ago, and make affidavit as to the mineral character of the lands alluded to. By placing mineral affidavits on these sections of lands, with the character of which mining men and old settlers are familiar, the railroad company will be compelled to give due notice before they can gain possession of the ground to which, in nine cases out of ten, they have no just right. If the miners and homestead and pre-emption settlers of this and Siskiyou county are alive to their interests they will look out for themselves at a very early date. This hint don't cost them a cent.—*Shasta Courier.*

A Valuable Dry Land Grass.

Continuing our showing of forage plants which are worth trying in this State, we take up at this time a grass which is but little known in this country, and that in Texas, where it is pronounced most valuable. It has no common name which is reported, but its botanical name is *Paspalum ovatum*. It is figured in the Department of Agriculture Report for 1880, where it is described as follows: Culms from a thick perennial rhizome, erect, 3 to 5 feet high, firm, smooth, marked by fine lines; with three or four leaves from as many dark smooth joints. Leaves at the base of the culm numerous, becoming withered and torn, somewhat hairy; the leaves on the culm erect, one quarter inch or more wide, some of the lower ones a foot or more in length, upper ones shorter, gradually long pointed, smooth both sides, roughish on the margins. The sheaths are rather loose, smooth, and longer than the joints. The raceme or flowering part is usually 6 to 8 inches long, composed of from three to six spikes, which are 1 to 6 inches apart on the rather slender axis; the lower spikes are 3 inches or more in length, the upper ones gradually shorter, slightly spreading, all with a few long hairs at the base. The spikelets are closely arranged in four rows, two on each side of the narrow and mostly straight rachis, in alternate pairs. The spikelets are about 1½ lines long, ovate, pointed, crowded, and overlapping, compressed, and the margins clothed with silky hairs. The two outer or empty glumes are ovate, acute, 5-nerved, smooth or nearly so, except on the margin, which is edged with thin white hairs. The inner or flowering glumes are cartilaginous in texture, roundish, obtuse, compressed, smooth, and shining, and, under the glass, very delicately punctate. The proper palea (upper palea) is of similar texture, fits into the margin of the flowering glume, and has a thin inflexed margin, infolding the three stamens and two feathery, purple styles.

This grass has only recently been detected in this country, and seems confined to few localities. It was collected in Louisiana by Dr. Ravenel; also, later at Fortress Monroe, Va., by Dr. Vasey, and more recently by Mr. S. B. Wallis, of Wallisville, Tex. It is also a South American species. Mr. Wallis says:

This grass I consider the most valuable of all the grasses that I am acquainted with. It is perennial, and grows here all the year round, furnishing excellent green feed for stock at all seasons, except that the green blades freeze in our very coldest weather, perhaps two or three times in a winter, and then grow out again in a few days time. It increases rapidly from seed, and also reproduces itself from suckers, which sprout from the nodes of the culm after the first crop of seed has ripened. I have seen these suckers remain green for six or eight weeks after the old stalks were as dead and dry as hay; and then, when the old stalk had fallen to the ground, take root and form new plants. It grows well on all kinds of dry land. The plant with roots two or three years old form stools 12 to 18 inches across, have very strong roots, and grow in the longest drouth almost as fast as when it rains.

COMET DISTRICT is all the go and a large amount of travel to and fro is going on; teams arriving and departing every day in the week. Even the brethren at Panaca have the Comet fever and are allured from their carrot patches by the glowing accounts of the fabulous richness of the new finds being uncovered. Thus far there has been nothing discovered to get excited about, though very rich ore has been brought to town. Stick to your carrot patches, boys, and follow the advice of the church and let mining alone.

THE leaching mill at Secret canyon, near Eureka, belonging to the Geddes & Bertrand Co., is run mostly by Chinamen, and will be run entirely by Chinamen at no late day.



A PERENNIAL GRASS FOR DRY LANDS.

manner, knowing that, if their efforts were successful, much credit would be reflected on them, as it was the first time any such work by divers had been done in mining operations. The diver succeeded in packing the pole, and a signal was given to the engine-man to work the engine. It started, and the plunger-pole worked in a very satisfactory manner all night; but in the morning the shaft men ascertained that the pole had failed, and wanted to be attended to again. The diver prepared and packed the pole the second time, and continued to attend to it until the work was deemed too laborious for one man to continue to do, and the services of a second diver was called in to perform the same work as the former.

UNCLE BILLY RAYMOND writes J. Ryan that he has a very favorable opinion of Calico district. He says that he will erect a mill this spring.

CAVE VALLEY.—John Sheridan and several others left Bristol last week for Cave valley, which is now attracting the attention of the prospector. The gold rock discovered there is reported as being quite rich.

the perseverance of the Bullion Company, being developed sufficiently to keep one mill running, and it is hoped that the time is near when the bullion shipments will equal, if they do not excel, the product of the camp in its palmiest days. In addition to the developments in the Bullion mine, we learn that Nick Frayer has made important developments in the old works of the Live Yankee mine, and that the success which his energy and perseverance entitles him to is about to be realized.—*Silver State.*

THE Windsor Mill is now in complete running order. The pack trains are busy packing ore from the Mount View mine to the wagon road at the base of the hill, whence wagons haul it to the mill. There will be a plentiful supply of ore at the mill in a few days to keep it running.—*Pinal Drill.*

RODGERS' DISTRICT is excited over the rich strikes. The World Beater bids fair to beat the world. They are taking out at the rate of one ton of ore per day to each man, some ore running from \$400 to \$1,600 per ton. Each man cleans at least \$150 per day.—*Pinal Drill.*

THE ENGINEER.

Why Men Cannot Fly.

The New York *Sun* wisely concludes that this century is likely to be forever memorable for its mechanical and engineering triumphs. It is distinguished from all the centuries which have preceded it as the age of steam and electricity, of rapid transportation for human beings and their products, and for bringing all the world in instant communication, one part with another.

Other eras may have surpassed us in literature and art. Some of our metaphysical science may not be so wonderful to the future as it seems to us; but our mechanical and engineering development has been so far beyond anything of the same sort in the past, even taking many centuries together, that this century is separated from the eighteenth by the broadest gulf in the history of human progress from era to era.

Yet, with all our mechanical triumphs and our engineering achievements the *Sun* thinks that we are no further advanced in one respect than men were one hundred years ago, or a thousand years ago, except to some slight extent for military purposes. Ballooning has made no progress, and is still nothing more than an amusement of no practical value. We do not seem to be any nearer flying than men were at the beginning of the Christian era. Our modern engineers have not yet constructed a practicable flying machine; nay, they have not yet so much as taken the first step in that direction.

The London *Engineer*, which has lately discussed flying machines in a scientific way, comes to the conclusion that there is no combination of wings or arrangements of any kind which will enable a man to fly with his own strength. He lacks muscular power to practice the accomplishment in which the birds are so proficient. And even if machines are devised to compensate for that lack of power and endurance, they will not be successful unless they shall be so constructed that each pound of the machine will develop as much energy as each pound of a bird. "Not till then," says this engineering critic, can flight for man be achieved.

Because birds fly, that is no reason why man should do the same thing, even if he is able to fit to himself wings as well adapted to his body as the wings of the birds are to its physical construction. Already "the wings of many model flying machines act just as do those of the rook and other birds," whose movements are slow enough for us to observe just how they fly. For there is a great difference among birds as to the rapidity of their flight, and not only that, but also as to the grace with which they do it. They have various styles of moving through the air, some graceful, and others comparatively clumsy, just as the walk of a courtly woman differs from that of a Sioux squaw. "We have no doubt," says our London contemporary, "that if men could once fly, we should soon have as many styles developed as there are men."

We have said that the reason men do not fly is not merely because they lack wings, but also because they are not strong enough. There is no bird of flight which weighs as much as even a very light man, but there are many birds which are far stronger than men. The limit of weight beyond which the air cannot be utilized for bird flight is somewhere about 30 pounds. Nature does not produce heavier birds, and doubtless for the reason that the air is not the proper home for animals weighing more. "The conditions under which species are developed," says the *Engineer*, "are such that everything goes as far as it can go in size and speed." The roc of Eastern story it pronounces a "mechanically impossible creature."

The albatross is the largest bird in existence, and one of the heaviest. There are heavier birds with limited powers of flying, but the maximum weight of any natural flying machine which can fly well does not exceed 30 pounds, according to the *Engineer*; and the weight of the albatross seldom, if ever, exceeds 28 pounds, or one sixth that of a powerful man. But the albatross can keep its wings, 13 feet long from tip to tip, in motion for a whole day, while the strongest man would be exhausted, if he had to keep beating the air with them, in half an hour. And to fly he would need far heavier wings to be kept in motion.

After a mathematical calculation, the *Engineer* comes to the conclusion that the albatross possesses as much muscular energy as a man, and far more endurance, with which to propel the 28 pounds of its body. "We have in the bird," it adds, "a machine burning concentrated fuel in a large grate at a tremendous rate, and developing a very large power in a small space. There is no engine in existence, certainly no steam engine and boiler combined, which, weight for weight, gives out anything like the mechanical power exhibited by the albatross."

The conclusion arrived at by both of our contemporaries is that man will have to give up the hope of competing with the birds in flying.

USEFUL INFORMATION.

An Asphalt Mortar.

The *Centrobblatt der Bauverwaltung* describes a patented composition made at a factory in Stargard, Pomerania, which has for some years past been used with perfect success on the Berlin-Stettin railway for wall copings, water-tables, and similar purposes requiring a water-proof coating. The material is composed of coal-tar, to which are added clay, asphalt, resin, litharge, and sand. It is, in short, a kind of artificial asphalt, with the distinction that it is applied cold, like ordinary cement rendering. The tenacity of the material, when properly laid, and its freedom from liability to damage by the weather are proved by reference to an example in the coping of a retaining wall which has been exposed for four years to the drainage of a slope 33 feet high. This coping is still perfectly sound, and has not required any repair since it was laid down. Other works have proved equally satisfactory. In applying this mortar, as it is termed, the space to be covered is first thoroughly dried, and after being well cleaned is primed with hot roofing varnish, the basis of which is also tar. The mortar is then laid on cold, to the thickness of about three eighths of an inch, with either wood or steel trowels, and is properly smoothed over. If the area covered is large, another coating of varnish is applied and rough sand strewn over the whole. The waterproof surface thus made is perfectly impregnable to rain or frost, and practically indestructible. The cost of the material laid is estimated at not more than 10 cents per square foot, and it is stated that this price can be reduced by at least two cents for large quantities put down by experienced workmen.

TIN ROOFING, to be good, must be put on with care, well turned up and over all angles, and flashed around all openings. As it is subject to expansion and contraction, leaks are always the result if proper allowances are not made. This is provided against by a raised standing joint, which costs a little more, but pays better by lasting longer; a flat joint is cheaper, but not durable. Tin should always be painted on the outer side of the sheets before using, as the sweating from condensation of vapor causes it to rust readily. Tin roofs should be painted thoroughly every two years, and in angles every fall. Tin sheets are 10x14 inches in size, and of different thickness; sized by X, XX and XXX. XX is the best for general use, as the metal is thin, pliable, and less liable to crack under strain of contraction than thicker metal; anything thinner rusts through too easily. It is known among makers and dealers by different brands, which designate the quantity of tin actually used. Tin is bright, and of a silvery color; adheres in large, smooth flakes. Compositions of lead and tin, or zinc, are a dead smoky color, and last but a short time under the corrosive influences of salt air, smoke and acids, these being principal causes of its decay.

JAM FROM TURNIPS AND TAR.—According to the correspondent of a trade journal, it is a mistake to suppose that fruit is absolutely necessary to the manufacture of preserves. He describes a visit to a large jam-producing factory, in which he found that the work was being bravely carried on without the aid of fruit at all. Jams of various kinds were being produced before his eyes—currant, plum, strawberry, apricot, raspberry, and gooseberry. Yet neither currant, plum, strawberry, apricot, raspberry, nor gooseberry was in the building. Turnips served the purpose of the fruit. The flavoring matter was extracted from coal tar, and the resemblance to raspberry and strawberry jam was further produced by mixing the boiling compound with small seeds of some cheap innocuous herb. A common form of sugar is used, and this is the only honest ingredient of the mess. These preserves are offered as made from "this season's fruit."

ADAMASCORITE is the local name of a mineral which is said to be found in only one place in the world, and that is the State of Missouri. The company which now owns the whole quarry will transport the stone quarried to Winchester, N. H., where it is to be manufactured into such articles as are deemed salable. The stone is very peculiar in its structure and properties. Its cutting power is diamond-like, cutting away steel very rapidly, and still retaining an exceedingly fine edge.

THE RUBBER PLANT IN MEXICO.—Mexico is making a study of the culture of the rubber plant. The hardness of the plant is said to be such that its culture is exceedingly simple and inexpensive, where the climate and soil are suitable. In much of the Mexican coast region the only expense is the weeding required when the plants are young, to give them a chance to grow and strengthen.

REPORTS come from Mexico of the discovery, near La Paz, of the largest pearl the world has ever seen. It is of light color and of oval form, one inch in length and three quarters of an inch thick at its shortest diameter, and of surpassing luster. No doubt the oyster was glad to be put out of its misery, for its tenant was too big to be accommodated, and too strong to be dispossessed. For a long time the poor bivalve had been unable to close its habitation. The owner of the pearl says that an offer of a sum less than \$50,000 for his treasure would be treated with perfect contempt.

Useful Notes on Water.

One gallon of distilled water weighs 10 pounds; one gallon of sea water weighs 10.32 pounds. 1.8 cubic feet of water weighs one hundred weight; 36 cubic feet weigh one ton, equal to 224 gallons; one cubic foot contains six and one fourth gallons. [The English standard, or Imperial gallon, is here referred to.] The average daily consumption of water in towns is 16 to 20 gallons per head. In pipes, the square of the diameter in inches equals pounds weight of water per yard. Example: An inch pipe holds nine pounds per yard. One hundredth inch of rain is about one ton weight to the acre. A nominal horse power for a boiler requires one cubic foot of water per hour. Circular apertures are most effective for discharging water, since they have less frictional surface for the same area. The *vena contracta* is the best form of orifice for discharging water. The ordinary speed to run a pump is 80 to 100 feet per minute. The pressure in pounds per square inch of a column of water is the height of a column in feet multiplied by .534, or, for an approximation, one half pound pressure per square inch for each foot of height. Water, in flowing through an aperture, has a velocity equal to that acquired by a heavy body falling freely from a height equal to the distance between the center of the aperture and the surface of the water. Doubling the diameter of an aperture increases the flow four fold. A man can raise water from a well 10 feet deep at the rate of 30 gallons per minute. The approximate time occupied in discharging equal quantities of water, under equal heads, through pipes of equal length, varies from 80 for a straight pipe, 200 for a curve to 240 for a right angle.

EXPLOSIVE MIXTURES.—Explosive mixtures are sometimes prescribed by doctors not well informed in *matéria medica*. Chlorate of potash, permanganate of potash, and glycerine are some of them. A pomade of chloride of lime, sulphur, and other substances, will detonate when rubbed in a mortar. Hypophosphite of lime or soda, when triturated alone, sometimes explodes. Pills of oxide of silver are apt to decompose with a tremendous explosion. Tincture of iodine and ammonia form the iodide of nitrogen, a violently explosive substance, which, agitated with water, is nearly certain to detonate. Chlorate of potash and tannin are likely to act in the same way. A dentrifrice containing chlorate of potash and catechu has been known to explode in the mouth.

GOOD HEALTH.

How to Sleep.

Health and comfort depend very much on attention to matters that to some seem very trivial. We have sometimes heard persons complain that they did not sleep well; that they were troubled with horrible dreams, and arose in the morning weary and nervous. Inquiries as to diet, exercise and other essentials of health have often failed to reveal anything that could account for these unfavorable conditions.

It is not well in these cases to limit our investigations to the routine of a day; but we should inquire at what hour the patient goes to bed, what he thinks about usually, and most particular what position he places himself in to invite sleep? If he lies on the back with his hands over his head, there will be a half conscious sense of compression of the chest, with difficult breathing, to relieve which he opens his mouth. The air coming in contact with the throat causes dryness, and then snoring will begin. In the meantime the pressure of the viscera on the large artery, whose course is along the inner portion of the backbone, impedes the circulation of the blood, producing discomfort which manifests itself in horrid dreams. Thus the whole night is passed in a disturbed sleep, and perhaps many nights pass without one of refreshing sleep. The most unwise course under such circumstances would be to resort to the use of opium, or any other drug. The ranks of the victims of this unfortunate habit are recruited mainly from such cases as we have described. It is wonderful what control an individual can get over himself if he tries. There is no reason why a person cannot lie upon his side instead of the back, and keep his hands and arms down; then he will not open his mouth; then his throat will not become dry, neither will he snore or have bad dreams. But often he can't help thinking about his business, and his thoughts will run on for hours. This is also a habit that may be broken up. Have the will to put aside your thoughts, and in time you will have the power to do so.

We do not say that there are not other causes that habitually interfere with sound sleep, but we believe there is a remedy for each difficulty, which may be found by seeking for it.—*Herald of Health*.

A NEW USE FOR THE TRANSFUSION OF BLOOD. The transfusion of blood was successfully employed a few weeks since, in New York, in restoring to consciousness a man who had been found in his room unconscious from inhaling illuminating gas. Two physicians being called, one of them suggested the trial of the transfusion of blood. A colored man attached to the hotel consented to furnish the blood necessary for the operation, which was successfully per-

formed six hours after the man had been found, during all of which time he had been perfectly unconscious. Dr. D. C. Valentine, a well known New York physician, performed the operation, which he has himself described as follows: "After first tightly binding the arm of the person from where the blood is to be taken, and the arm of the person to whom the blood is to be transferred, an incision is made in one of the veins of the former, and the blood which flows from it is placed in a bowl; then the blood, which meantime has been thoroughly beaten to prevent coagulation, must be strained through a piece of linen into another bowl, when it is ready for placing into the arm of the patient. This is done slowly—a little at a time—by the aid of a syringe, through a puncture made in a vein in the arm, and the operation is done. It is, as you will see, simple and almost invariably effective. Of course, care must be taken to have a healthy person to draw from, as otherwise any disease might be transferred, though, to my mind, I would sooner have an unhealthy person to draw from than none at all."

A SCIENTIST ON TIGHT LACING.—Richard A. Proctor, the astronomer, once tried the experiment of wearing a corset, and thus describes the result: "When the subject of corset wearing was under discussion in the pages of the *English Mechanic*, I was struck," he says, "with the apparent weight of evidence in favor of tight lacing. I was in particular struck by the evidence of some as to its use in reducing corpulence. I was corpulent. I also was disposed, as I am still, to take an interest in scientific experiment. I thought I would give this matter a fair trial. I read all the instructions, carefully followed them, and varied the time of applying pressure with that 'perfectly stiff' bask about which correspondents were so enthusiastic. I was foolish enough to try the thing for a matter of four weeks. Then I laughed at myself as a hopeless idiot, and determined to give up the attempt to reduce by artificial means that superabundance of fat on which only starvation and much exercise, or the air of America, has ever had any real reducing influence. But I was reeking without my host. As the Chinese lady suffers, I am told, when her feet-bindings are taken off, and as the flat-head baby howls when his head-boards are removed, so for a while was it with me. I found myself manifestly better in stays. I laughed at myself no longer. I was too angry with myself to laugh. I would as soon have condemned myself to using crutches all the time as to wearing always a bask. But for my one month of folly I had to endure three months of discomfort. At the end of about that time I was my own man again."

HOW LONG OUGHT A MAN TO LIVE.—Thurloe Weed, who died the other day, was 85 years old. That in America is regarded as a very old age. It gave Mr. Weed distinction, as much as anything else, in his city. Comparatively speaking, Mr. Weed was an old man, but, in fact, he came nearer living out the measure of his days than the majority of men. There is no valid reason why, under favorable conditions, a man should not live 100 years. All animal life is found to be constituted with a stock of vitality sufficient to run it five times the period the particular animal requires to mature. For example, the horse matures in about five years, and will be dead in about twenty-five; the dog matures in about two years, and will be dead in about ten—and so on through the list; but a man who matures in about twenty years, and ought, therefore, to live 100, is dead, on an average, at 35. The failure of the rule in the case of the man does not prove that the rule is not applicable in his case, but simply that he fails to comply with the conditions of life. The lower animals come nearer complying with the conditions than man. Man wastes his stock of vitality, and is bankrupt before his term is half spent. There is nothing dearer to man, it is said, than his life, and yet there is nothing with which he is so improvident and reckless.—*Wheeling Register*.

HIGHT NIGHT AND DAY.—It is asserted by Dr. Merkel that a person's hight after a night's rest, measured before rising from bed, is two inches greater than in the evening, measured standing. On first rising, a sudden shortening takes place at the joints of the legs. The sinking at the ankle is one third of an inch; at the knee, one twelfth to one eighth of an inch; at the hip, two fifths of an inch. The contraction in hight is continued through the day by the gradual yielding of the arches of the feet and of the discs of the spine.

CONSUMPTION.—Consumption has hitherto been regarded as a disease of the lungs, which cannot be reached directly except by inhalation, and the value of that form of medication is problematical. A new theory of the disease, called the Salisbury theory, makes it one of unhealthy alimentation. According to this view, it is the fermenting of food in the stomach, which furnishes to the circulation noxious material that affects the lungs on reaching those organs. Granting the truth of the theory, we shall have to consider consumption as curable. All that needs to be done is to use only such food as will not ferment in the stomach, and to clean out the organ occasionally by a judicious use of warm water, with simple tonics before meals to aid the digestive process. A weak solution of ferrie per sulphate is recommended for inhalation to check hemorrhage in a severe stage of the disease. The idea is worthy the attention of the many who are disposed to be in the initial stages of consumption.



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SAN FRANCISCO:

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TABLE OF CONTENTS.

ILLUSTRATIONS.—Eureka Planing and Smoothing Machine, 201. A Perennial Grass for Dry Lands, 206. Apparatus for Assaying Bullion, 209.
EDITORIALS.—The Eureka Planer and Smoother; Mill Sites; Taste and Odor of Minerals, 201. Passing Events; Working Low-Grade Ores; A Great Legal Warfare, 208. Assaying of Silver Bullion, 209. Patents and Inventions; Notices of Recent Patents, 212.
CORRESPONDENCE.—Saving Flour Gold, 202.
MECHANICAL PROGRESS.—The Relative Economy of Solid and Gaseous Fuel; Paper Rails and Car Wheels; Can Iron be Burned in Melting?; Steam Boilers, 203.
SCIENTIFIC PROGRESS.—Electric Excitement; The Color of Pure Water; A Triumph to Dr. Draper; The Formation of Craters in the Moon; A New Sweet Compound; Heat and Magnetism; Light of Comets; The Action of Cement on Lead Pipe; The Highest Mountain Peak; Bleaching by Electricity, 203.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends and Bullion Shipments, 204.
MINING SUMMARY.—From the various counties of California, Nevada, Idaho, New Mexico, Oregon and Utah, 205-6.
THE ENGINEER.—Why Men Cannot Fly, 207.
USEFUL INFORMATION.—An Asphalt Mortar; Jam from Turnips and Tar; The Rubber Plant in Mexico; Useful Notes on Water; Explosive Mixtures, 207.
GOOD HEALTH.—How to Sleep; A New Use for the Transfusion of Blood; A Scientist on Tight Lacing; How Long ought a Man to Live; Night, Night and Day; Consumption, 207.
MISCELLANEOUS.—Penbody; The Coronado Mines; Low Grade Ores; Santa Fe District, 204. Reese River Pioneers; Divers for Mining Work; The Paradise Mines; Mineral Lands; A Valuable Dry Land Grass, 206.
NEWS IN BRIEF.—On page 212 and other pages.

BUSINESS ANNOUNCEMENTS.

Anti-Scale Compound—Berry & Place Machine Co., S. F.

Passing Events.

The people of this State are still anxiously looking for rain, and miners and farmers as well are deploring the fact that the expected down-pour holds off so long. It seems now almost certain that we shall have a very short water season this year, and the mining community will not be so prosperous as was hoped.

The winter may be said to be practically over, as far as the miners are concerned. Prospectors are daily starting out on their travels for the season, and from all sides we hear of parties being formed. Southwestern Nevada and southeastern California seem to present the greatest attraction for the miners of these two States. Idaho and Montana will also claim many hundreds. Arizona and New Mexico possess many attractions, and a great number of eastern people will undoubtedly join the army of prospectors this year.

Aside from what our "Mining Summary" records, there is nothing of note from the mining regions.

A RICH strike of decomposed quartz has been made in the 70-foot incline of the Northern and Southern Light mine, Patterson district. The ore is rich and plenty of it. The mine is principally owned by A. J. Severe, of Bridgeport.

THE February product of the Ontario mine, U. T., was \$153,611, and of the Homestake, of Deadwood, Terra and Highland, of Dakota, \$105,000, \$40,000 and \$42,000 respectively.

A DISPATCH from Salt Lake says: A very extensive cave is reported as having occurred in the Horn Silver mine, which is said to have damaged property to a considerable extent.

Working Low Grade Ores.

It is a conceded fact that the salvation of a large portion of the western mining regions depends more on some means of economically working low grade ores already found, than on the discovery of new and rich mines. It is more particularly the case with the older regions of this State and Nevada that the low grade ores must be made marketable before any great era of prosperity will be again seen. In European countries, concentration is always resorted to, and the ore brought up to a certain standard before being treated; but here concentration has not become universal. In fact it has been altogether too much neglected; but lately efforts have been successfully made in several localities and the merits of concentration are gradually becoming recognized.

Of course, there are other things necessary also to make a low-grade ore pay. There must be plenty of it; the locality must be readily accessible; means and charges of transportation must be favorable; economical management, and skill and knowledge on the part of superintendents and employees; and, moreover, the business must be conducted on business principles, without over capitalization, extravagance or carelessness. There is little doubt, as we are now progressing, that in 10 years from now we will be surprised that intelligent persons conducted mining affairs as they are in most cases now carried on.

It may encourage many persons with low-grade ore on hand to know that, by the use of improved devices and appliances they have, in the Black Hills of Dakota, reduced the cost of mining to 89 cents per ton, and the cost of crushing to 45 cents. Perhaps some figures in this connection will interest miners generally. A statement from Superintendent Mc Masters shows the yields, together with the cost of mining and milling, at the different mines in the Black Hills. They embrace, as we understand it, the product of all the properties from the outset of their exploitation up to July 31, 1882, as understood.

Homestake M. Co. produced.....	\$4,367,150 48
(Tons of ore milled, 684,733; average per ton, \$6.37)	
Highland M. Co. produced.....	1 175,632 45
(Tons of ore milled, 234,081; average per ton, \$5.02)	
Deadwood-Terra M. Co. produced.....	1,221,946 57
(Tons of ore milled, 249,320; average per ton, \$4.90)	
Deadwood M. Co. produced before consolidation of Deadwood-Terra M. Co.....	831,192 23
Golden-Terra M. Co. produced before consolidation of Deadwood-Terra M. Co.....	788,054 62
Giant and Old Abe M. Co. produced before consolidation with Homestake M. Co.....	72,169 34
Father De Smet M. Co., from Jan. 1, 1878, to Aug. 1, 1882, produced.....	1,974,640 36
(Tons of ore milled, 343,394; average per ton, \$5.74)	

Total product.....\$10,434,116 10
In connection with the central enterprise of this group, the following figures are significant:

Up to Dec. 31, 1879, the gross bullion yield of the Homestake Co. was.....	\$1,051,205 58
For January, 1880.....	75,509 00
For February, ".....	84,368 20
For March, ".....	90,150 23
For April, ".....	104,231 13
For May, ".....	118,468 31
For June, ".....	123,413 03
For July, ".....	128,768 96
For August, ".....	144,980 43

Total to Sept. 1, 1880.....\$1,924,769 52

Thus we see a steadily increasing production, while Supt. Mc Masters is able to show that the cost of mining has diminished from \$1.98 down to 89 cents per ton, and the cost of milling from \$1.59 down to 64 cents in the 80-stamp mill, and from \$1.22 down to 45 cents in the 120 stamp mill. Further: "The average gross yield of ore to June, 1879, was \$9.69 per ton. Since then it has been found of advantage to extract and mill all the rock between the walls of the veins. This has lowered the grade of the ore somewhat, but the gross amount milled has been increased in great proportion, while the cost of mining has been correspondingly reduced. The yield of the ore from September, 1879, to February, 1880, varied from \$4.25 to \$5.60 per ton. Since that date it has been increased by the ore of higher grade extracted from the 100-foot level, and now averages \$7.95 per ton."

From the dividend standpoint the showing is as follows:

DIVIDENDS PAID.	
Homestake—47 dividends.....	\$1,512,500
Father De Smet—21 dividends.....	540,000
Deadwood-Terra—20 dividends.....	740,000
Deadwood before consolidation.....	275,000
Terra before consolidation.....	75,000
Dividends of the group.....	\$3,142,500
Total assessment.....	400,000

A GENTLEMAN who came in from the Azusa yesterday informed us that some eight men are employed in the Azusa mining district developing a ledge there which was first supposed to be tin, but which is now believed to be nickel. In one of the claims a shaft has been sunk for some distance, and the ledge shows a width of about five feet.—Los Angeles Herald.

A Great Legal Warfare.

The Contest Between the Land Owners and the Hydraulic Miners—The Equities and Hardships on Both Sides.

The controversy now in progress between certain land owners in the interior of this State and a portion of the hydraulic miners, because of the large pecuniary interests involved, and the persistence with which it is being urged on the one hand, and the stubbornness with which it is being defended on the other, promises to become one of the most remarkable legal combats of modern times. Notwithstanding a very great deal has been published on the subject of this controversy, there still exists much misapprehension concerning its history and merits; the interior press having, through local interests, been so inclined to favor one side or the other, as to have hardly ever presented a fair statement of facts or expressed an unbiased opinion in regard to it. But as this is a question that involves many and broad equities on both sides, it requires to be discussed, as far as may be, in a calm and impartial manner. And it is just this feature of the case—the large element of right that pertains to both sides that constitutes the great trouble in disposing of it. It is the much that can justly be urged on behalf of the plaintiff and also on behalf of the defendant, that has embarrassed the courts and the juries and so widely divided public opinion on this matter. If the right were all obviously and incontestably on one side the case could have been disposed of very quickly. If it were clear, or could easily have been made clear, which party was entitled to a verdict, such verdict could have been obtained and the questions at issue met with final adjudication long ago. It is all very well for the plaintiffs in these suits to contend that the defendants are in the wrong, and *vice versa*. And it is an easy matter for the lawyer who is retained for that purpose to argue that the equities are all on the side of this client. But with the properly constituted judicial mind the case is very different. Every judge who has been called upon to hear these cases has confessed to a great deal of embarrassment in their adjudication; so much that is new, so much that pleads for the other, coming up to be considered and determined. Thoroughly informed as to all the facts, capable of analyzing the testimony and weighing the evidence, learned, impartial, and dispassionate, Judge Temple, in his findings in the case of *The People vs. the Gold Run Mining Co.*, seems so conscious of the hardship that his decision will inflict upon the defendants, that he, in this same decision, provides a way by which they may, to some extent, escape such hardship, as regards the rights and wrongs of the parties to this contest. So nearly are they balanced, in fact, that they will probably never be able to reach a final adjustment of their differences, except through such concessions on both sides as are implied in the carrying out of Judge Temple's decision: Each will have to yield, and each will have to suffer some, to the end that both may escape the very serious injury that must otherwise befall them.

That the difference between these parties really ought to be settled through the practice of much forbearance and some natural concessions becomes fully apparent, when we come to weigh the arguments advanced by each in their own behalf, a synopsis of which argument we here present for the consideration of that large class of readers presumably interested in this matter. Before proceeding, however, to give these parties such hearing, it may be well to correct certain misconceptions that seem to prevail on the subject, and to strip the latter of such superfluous and irrelevant matters as only tend to confuse and mislead.

Area and Location of Injured Lands.

Relying upon the exaggerated statements that have obtained currency through various prejudiced channels, many persons at a distance have an idea that a vast amount of land has been destroyed, and that the agricultural interests of California generally have come to be jeopardized by the debris sent down from the hydraulic mines; whereas, the injury caused by this material, actual and threatened, is confined to a comparatively small area. The quantity of land that, up to the present time, has been rendered unfit for cultivation thereby, is variously estimated at between thirty and thirty-five thousand acres, besides ten or fifteen thousand acres that have been more or less

injured, with a considerable quantity that, in process of time, must be in like manner damaged, should hydraulic mining be suffered to go on as heretofore, unchecked, and without provision being made for keeping back the heavier portions of this debris or tailings, as the mixture of sand, gravel and mud carried off by the water from the mines is variously termed. The above are the estimates of the several officers belonging to the U. S. Corps of Engineers—the farmers and the experts in their employ making the area of these damaged lands somewhat larger.

Of these lands so injured and exposed to be injured, the greater portion is situated along the Bear, Yuba, Sacramento and Feather rivers, with some little also on the American, the Consumnes, and other streams little further south; the whole of it amounting to hardly more than one half of one per cent. of the quantity of land in California that may be considered fit for cultivation.

Not All the Mines Implicated.

As only an inconsiderable portion of the arable lands of the State has been injured by these slums, so has only a portion of the hydraulic mines been concerned in causing this injury; this class being confined to those that discharge or dump their tailings into the above named rivers or their tributaries. The extensive hydraulic mining region, occupying the northwestern angle of the State, has contributed nothing toward producing this injury. The mines there outlet into the Trinity and Klamath rivers and their confluents, and as these streams, which, through the Klamath, discharge their waters directly into the ocean, are not navigable, and there is but little farming land along them, not much complaint has yet been made of hydraulic mining in that section of the State. As no injury can there ensue from the shoaling of the rivers, and there are no harbors to be filled up—no objection on this score can, of course, be urged against a continuance of hydraulic operations. It is the case, however, that the miners even there are being threatened with suits by parties owning small patches of land along these streams, which, it is alleged, have been damaged, or, at least, are endangered by the mining detritus; and it is by no means certain that this industry will escape attack should it be finally determined that the miners are liable for injuries of this kind. If it should be held that they can be stopped from working their claims, because of such slight injury done, or because of their fouling the water in the rivers, it would prove very detrimental to that region of country, as more than one half of the inhabitants are dependent on this branch of mining for their livelihood.

Not all the hydraulic mining companies that formerly sent their tailings into the rivers further south continue that practice. The Spring Valley Company, operating on a very extensive scale at Cherokee Flat, Butte county, no longer suffer the detritus from their mine to make way into the Sacramento river, as for many years at first it was permitted to do. Finding that they were causing some harm to the farming lands along Dry Creek, the outletting channel of their mine, this company several years since hought up the land so injured to the extent of some 16,000 acres, and then proceeded to so dispose of these slums, by means of dykes, ditches, etc., that they have rendered nearly the whole very valuable for farming purposes; this stuff, before so hurtful by reason of its too great accumulation on small areas, having through its proper distribution, been converted into a valuable fertilizer.

Having thus made certain needed corrections, and narrowed the field of the maleficent mines to its proper dimensions, let us proceed now to consider

The Arguments of the Farmers and Miners, Pro and Con.

Presenting the same in the following condensed form, omitting such causes of complaint as seem trivial, or seemingly without good foundation. The farmers, conceding that the miners are the rightful owners of the properties they are working, of the ditches and other appurtenances thereunto, insist upon their observing the legal maxim, that every man must so use his own as to inflict no harm upon another. They admit that the hydraulic miners have a right to work their claims, provided they do so without violating this principle of law. But this, say the farmers, they have not

done, and are not willing to do, if, indeed, such a thing is possible. In the first place, they have, by discharging the debris from their mines into the rivers and mountain streams, so fouled the water that it is no longer healthful, or fit for domestic uses. These streams, which, before hydraulic mining commenced, or at least, before it was prosecuted on its present extended scale, were comparatively clear and pure, are now filthy, and so charged with mud that the water not only causes disease, but it is unfit for drinking or for washing purposes without being first filtered, or allowed to stand for a long time and settle. In this complaint, the inhabitants of the towns along the streams join the farmers, they being even greater sufferers from this phase of the evil than people living in the country.

The next count on the farmers' list of grievances is the damage done to the land, which, in the aggregate very large, has, in most cases, been complete, laying waste entire farms, and leaving the owners without an acre of tillable land, even their orchards and gardens having, in some instances, been destroyed. And this element of destruction is still active, encroaching slowly but steadily on the low grounds lying along and adjacent to the outletting rivers, the land rendered worthless through its agency amounting every year to some thousands of acres. The land already ruined, as well as that menaced with ruin, consists mostly of rich alluvial bottoms, worth from \$30 to \$60 per acre, being of the average value of \$40 per acre at the lowest calculation.

Then, much inconvenience and loss have been caused by reason of this debris so filling in and raising the bottoms of the rivers as to produce extreme floods such as would not otherwise have occurred, and which, besides great injury to the farming lands, has compelled the residents of the towns to keep continually raising the levees thrown up for their protection, thereby putting them to much and constant increasing expense, while it tended to promote disease by interfering with the natural drainage.

This filling in of the bottoms of the rivers, besides producing a higher flood line, has tended to obstruct their navigation; another cause of serious injury not only to the towns along them and to the country adjacent, but also to the State at large. Steamers that could formerly ascend the Sacramento and Feather rivers at all stages of water are now no longer able to do so; these streams having been so shallow at some points as to render the passage of even boats of light draft difficult in the dry season, it being argued that this lifting up of the beds of these rivers, if suffered to go on, must ultimately raise them so high that they will be likely to leave their present channels and submerge the country adjacent, reducing it to a common marsh till these streams shall make for themselves new channels. In addition to the foregoing, the farmers urge many minor reasons why hydraulic operations should be stopped until such time as the miners have provided means for so effectually impounding their tailings that they will cause no further serious harm.

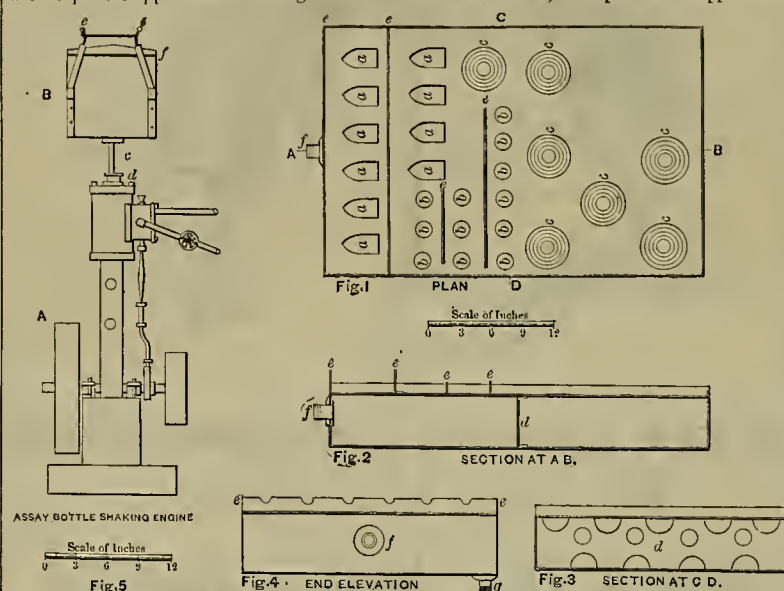
The Answer of the Miners

To these representations on the part of the farmers and their allies is briefly as follows: We, with a few exceptions, took up our mining claims and commenced working them before you became possessed of your agricultural lands or founded your towns on the banks of the rivers. In securing these claims we conformed to the modes of procedure established by the laws, local and statutory. At that day, mining being considered the paramount interest of the country, to those engaged in that industry were conceded by the State and National Legislatures certain special privileges, among others the right to adopt such local usages and regulations as they might see fit, and which were to be recognized as having the force of legislative enactments.

By virtue of these local laws the miners were permitted to appropriate the water running in the mountain streams, divert it from its natural channels, and, conducting it through ditches upon their mines, there employ it in washing the auriferous gravel, which, after being washed, was run off and deposited in the form of tailings in the creeks, gulches and rivers below; these privileges carrying with them, of course, the right to foul and muddy such water to an unlimited extent. Although wholly subversive of the doctrine of riparian

rights as promulgated by the English Common Law, this mode of procedure, having so grown into a well established usage, came to be generally acquiesced in and recognized as sound law by the Legislatures and Courts, both State and Federal.

Presuming upon the validity of these local laws so everywhere acknowledged, and trusting to them for protection, the miners went on, and by purchase from the general government, or by other legal means, secured their claims, and at great expense made the necessary improvements upon them, under the implied guarantee that they should be allowed to work them in the way they had been accustomed to do inasmuch as they could profitably work them in no other. These laws were in force and active when the majority of the farmers entered upon their lands and commenced cultivating and improving them, these parties being at the time well advised as to their existence and what the miners claimed under them. But, as no one at that day apprehended any great harm would result from emptying this debris into the rivers, these farmers are not to be censured for having planted themselves so squarely in the path of these damaging floods. Commencing in 1851, hydraulic mining had, during the first 10 or 12 years of its existence, been carried on in a constantly expanding, but still in a comparatively limited way, operations having been conducted by a multitude of small companies, working with imperfect appliances and using but little



APPARATUS FOR ASSAYING SILVER BULLION.

water; but as they were mostly engaged in washing the top dirt, which was loose and easily moved, these companies managed to run off immense quantities of this material, the greater portion of which lodged in the outletting streams above the farming lands and there remained until the flood of 1861-2, which dislodged and carried most of it down and deposited it on the river bottoms below. After the channels of the mountain streams had been so cleared of this impacted mass, they refilled, but slowly, a good deal of the fresh tailings from the hydraulic mines having since been transported further down, the coarser particles being left on the farming lands, while the finer, suspended in the water, were carried still further down and deposited in the shallow bays, or were floated off into the ocean.

(CONCLUDED NEXT WEEK.)

IRON UNDER STRAIN.—Prof. Thurston, testing pieces of wire cable of the Fairmount suspension bridge, recently taken down at Philadelphia, after being in use about 40 years, found the iron to be fully equal in tenacity, elasticity and ductility to the best wire of the same size found in the market. This fact, and similar results obtained by other experiments in 1878, led him to the important conclusion that iron subjected to the ordinary strains of properly designed bridges does not deteriorate with age.

The employees in the railroad shops at Sacramento struck for more time. Saturday the number of working hours was reduced from ten to eight, the compensation per hour remaining the same. A strong dissatisfaction is manifested along the entire line of the Central Pacific which is included in the order. Wages are reduced 20 per cent by this edict.

Assaying of Silver Bullion.

The pieces of apparatus described in this article have been in use for some time at the laboratory of the Pennsylvania Lead Co.'s works, and have been found to give good working results, and to be simple and convenient. The description is by F. C. Blake, Mansfield valley, Pa., who read it at a meeting of the American Institute of Mining Engineers:

Steam Bath.

This steam bath is shown by Figs. 1, 2, 3, and 4. It is made of sheet copper, about one twelfth of an inch thick, the joints being brazed, and is used for heating the bottles in which the silver samples are dissolved, previous to the fineness determination by the Gay-Lussac volumetric method, for heating the flasks in which the gold parting is made in assays of bullion, or in general assay buttons and for general analytical work.

Fig. 1 shows a plan of the bath. The orifices, marked *a*, are made of the proper shape, hold the silver assay bottles in an inclined position, the necks resting on the raised flanges, *e, e*. There is described in Percy's volume on *Gold and Silver*, part 1, page 289, a bath for heating silver assay bottles. It has this advantage, however, that the bottles stand erect, and there is a slight danger that some of the fine spray arising with the evolution of nitrous oxide during solution of the silver may be projected from the bottle, or upon the stopper neck.

rich, and has proved to be a great convenience in making silver fineness determinations by the Gay-Lussac method. The bottles are excluded from the light, and there is no difficulty in obtaining a perfectly clear solution, when the bottles are shaken for two minutes. If more convenient, the small engine could be replaced by a crank, connecting with a line of shafting, but I think the engine to be preferable, and to be a great improvement over hand shaking, or the shaking case, as often arranged, with springs above and below the case.

We have found that the Gay-Lussac method of volumetric assay is the most reliable and convenient for determining the silver fineness of bullion that contains but a small percentage of copper, or other impurities. The Stas pipette is the best form for convenience and accuracy. The arrangements for determining the temperature of the salt solution, when assays are made as described by Sire and others, are not reliable in general work, unless more time and care are used in making corrections than would be needed to make a determination of the value of the salt solution upon fine silver with each set of assays. This latter method is probably the better one. With each set of determinations one should be made upon pure silver, from which the strength—whether above or below the normal—of the salt solution can be determined. All the assays of any set, including that of fine silver, are made under exactly the same conditions, and the results should be reliable if the test silver is pure. There is no difficulty in preparing pure silver if care is taken to obtain a pure chloride. If silver, 998 or 999 fine, cannot be used to dissolve for precipitation as chloride, it is best to redissolve the silver first reduced from the chloride and reprecipitate. The assays, made by different persons, of silver bullion bars, often do not agree exactly, especially when the bullion contains a considerable percentage of impurities. One cause for the different results is due to the sampling. The bar should always be sampled, when it is possible, as it is poured, a small portion being taken with a sample ladle, as soon before the bar chills as possible, and granulated in water. There will be sometimes a slight difference between the poured sample and one which is cut from the surface of the chilled bar, due to molecular changes in the alloy as the bar cools, especially if the bullion is quite impure and cools slowly. It is evident, I think, that a sample, properly taken when the bullion is poured from the cupel test, or from a crucible, is the sample which will most accurately represent the bar.

Sawtooth District.

Large Quantities of Ore.

The more promising mines in Sawtooth District are situated not far from Sawtooth city, on Beaver Creek, Lake and Eureka Creeks. The belt is mostly within a diameter of six miles, and many of the mines within the circuit are well developed.

The Silver King, owned by Kelly & Co., is a property of considerable merit, as is also the Pilgrim, in Bear gulch, and the Sunbeam, near by. Across the divide is the Wire Silver, located in 1879, which has always been regarded as a bonanza. The owners have developed the mine steadily, and the past summer shipped nine tons of the ore to the Buffalo mill in Atlanta, which netted \$1,700 per ton, and as this was not considered the full value no more ore was shipped. The owners are practical miners of many years' experience, and have expended some \$4,000 in developing the property by tunnels and incline shafts upon the vein. Taking the full width of the ore it will average 600 ounces in silver to the ton, and \$200 and upwards in gold. Near by is the Comstock, opened by an incline shaft 130 feet deep, which shows a four-foot vein at the bottom encased in permanent walls. Considerable ore has been extracted, and is now upon the dump, which will mill 300 to 600 ounces in silver per ton. The vein is uniform and rich from the surface down, so far as explored.

Next above is the Silver Bow, owned by the same parties, and an extension of the Comstock. This location has ore upon the surface the entire length of the claim. The vein is eight feet wide, mostly ore sulphates and antimonial silver predominating. The vein formation is from 20 to 25 feet wide. Adjoining the Silver Bow is the Comet mine, owned by Capt. Wooster, and being developed by a tunnel. The ledge is 20 feet wide, with high-grade ore all through it.

Next above is the Atlanta, owned by J. D. Murphy, and a very valuable property, as is also the Lucky Boy near by.

There will be a large quantity of gold and silver ore shipped from the above mines next season. The Sawtooth country has been favored with a mild winter, and very little snow now remains. Miners in from that section say dust will be flying there in a few weeks.—*Wood River Times*.

Shaking Engine.

Fig. 5 gives an elevation of a small upright engine, which has a rod, *c*, running through the packing gland, *d*, in the upper cylinder head. A box, *B*, is screwed to the rod, *c*. This box is made to hold nine silver assay bottles. A piece of sheet rubber is fastened upon the bottom of the box, and also a sheet to the under side of the cover, *f*. The cover, *f*, is clamped down tight upon the bottles by the hinged holders, *e, e*, which are held in place by a rubber band. In this way the bottles and their stoppers are held firmly in place, and will not be disturbed by the shaking. This small engine, as arranged for shaking the silver assay bottles, was introduced by Mr. E. F. Eu-

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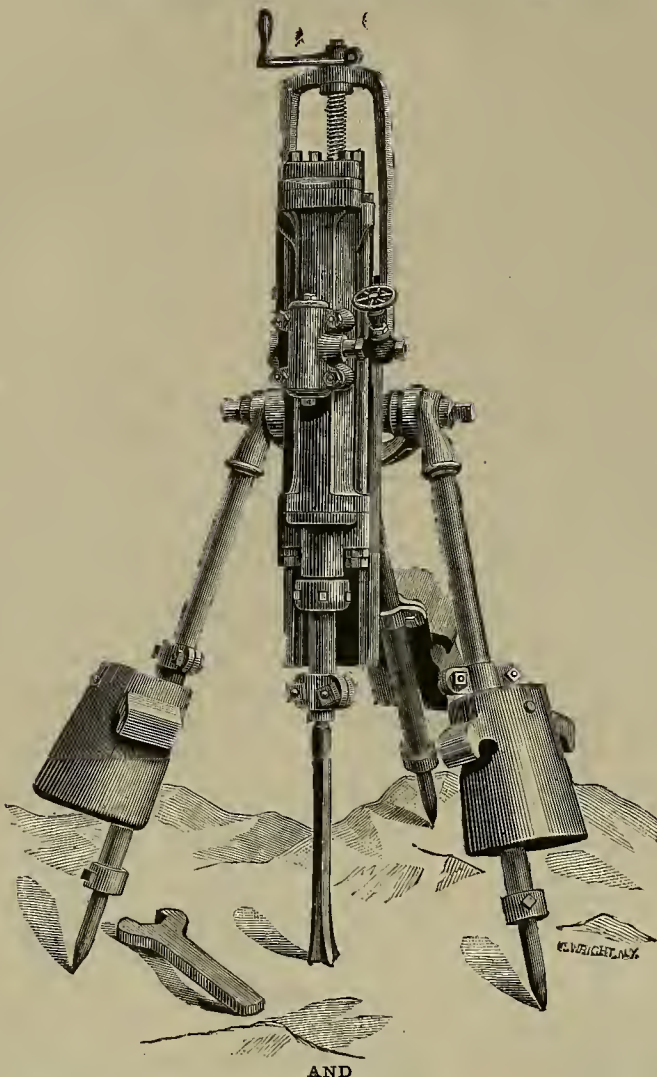
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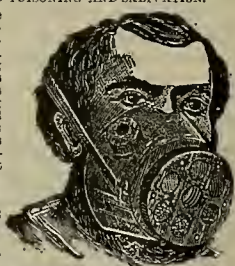
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Large or Small for flat or round rope. Double Cylinder Engines, from 6x10 to 18x60. This latter size furnished J. B. Haggin for Olan and Old Abo Co., Black Hills also Corliss Pumping Engines, 26x60, for Hoisting and Pumping Works, for 2,000 feet deep. Baby Hoists for Prospecting, 4 H. P. to 6 H. P.

Wire Rope, Safety Cages and any Size and Forms of Cars.

Principal Office and Works, Fulton and Union Sts., Chicago, Illinois.

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Coarse Concentrating Works, Improved Jigs, Crushing Rollers, Sizers, Trommels, Rittenger Tables, and all other adjuncts for the proper working of Gold, Silver and Copper Ores, complete in every detail. HALIDE IMPROVED ORE TRAMWAYS. We refer to Gen. Custer mine, Idaho, 5,000 feet long; Columbus Mine, Col., 4,750 feet long; Mary Murphy mine, Col., 5,000 feet long, all in constant operation.

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Improved Corliss and Plain Slide Valve Meyer's Cut-off Engines.

CORLISS ENGINES from 12x36 Cylinders to 30x60. PLAIN SLIDE VALVES from 6x10 to 36x30. BOILERS of every form, made of Pine from Works C. H. No. 1 Flange Iron, or Oils Steel. Workmanship the most careful. All Rivets Hand Driven.

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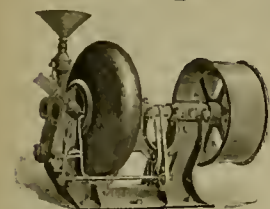
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For reducing to an impalpable powder all kinds of hard and brittle substances, such as QUARTZ, EMERY, CORUNDUM, GOLD AND SILVER ORES, BARYTES, COAL,

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It is simple and not liable to get out of order. Revolving Shell being constructed of Siemens-Martin steel, and all parts mechanical in design and of first-class construction. Weight 5,500 lbs.; heaviest piece, 1,500 lbs. It will pulverize 7 to 10 Tons in 10 Hours with 30 H. P. For circulars and full particulars apply to or address,

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The Granite Stone from the Penryn and Rocklin Quarries was declared by experts at the Philadelphia Centennial Exposition to be the

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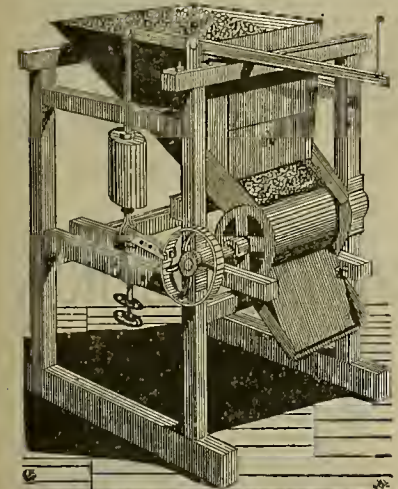
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THE ROLLER ORE FEEDER.

Patented May 23, 1882.



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery, as required. In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

Golden State and Miners' Iron Works,
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IRON SLUICE RIFFLE.

I have an Iron Riffle, adapted for Hydraulic, Drift and Quartz sluices, which is proving very efficient, below everything else. (Cost six cents per pound.) Address, ALMARIN B PAUL, Room 20, Safe Deposit Building, San Francisco. The following speaks for itself:

INDIAN SPRING DRIFT MINE, Feb. 26, 1883.
Mr. A. B. Paul:—I have tried your Riffles thoroughly, and find them a fine Riffle. They are good with quicksilver or without. They gather the fine gold and rusty gold. I find gold that will not touch quicksilver stops in them, and which glides over 300 feet of sluice above them. I shall try 30 more, and if they save the same amount of gold in four weeks' run, I shall want 100 more. I am not afraid to vouch for them. B. O. McLAIN, Superintendent Indian Spring Drift Mine.

SELBY

SMELTING and LEAD CO..

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Gold and Silver Refinery And Assay Office.

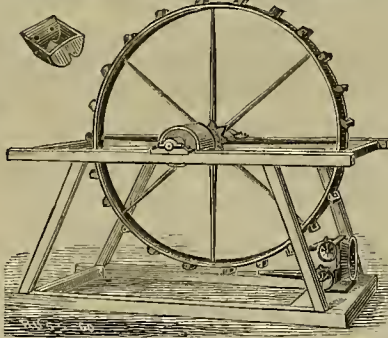
HIGHEST PRICES PAID FOR Gold, Silver and Lead Ores and Sulphurets.

Manufacturers of Bluestone. ALSO, LEAD PIPE, SHEET LEAD, SHOT, ETC.

This Company has the best facilities on the Coast for working

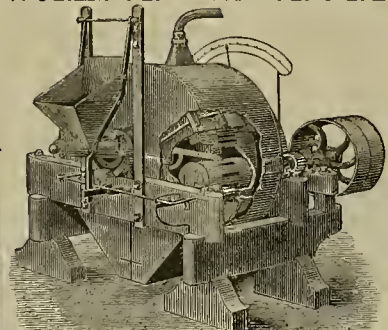
GOLD, SILVER and LEAD IN THEIR VARIOUS FORMS. PRENTISS SELBY, - - Superintendent

PELTON'S PATENT Reaction Hurdy Gurdy Water-Wheel.



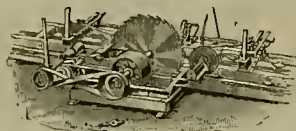
This Wheel will be guaranteed to purchasers to give 8% of the theoretical power of water. Send for circular to L. A. PELTON, Nevada City, Nevada Co., Cal.

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To parties contemplating the erection of new works for manufacturing purposes this is

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The plant will be sold at a very low rate.

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N. B.—Mr. J. L. Boone, of the above firm, has been connected with the patent business for over 15 years, and devotes himself almost exclusively to patent litigation and kindred branches.

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Laws, Forms, Instructions and Decisions.

Has no surplus verbiage. Contains Dr. Raymond's Glossary. Explains how to examine mining titles. Contains numerous court decisions. Gives the Public Land Commission's Codification, and gives many and improved forms. Price—Full law binding, extra paper, 680 pages, \$6.00. For Sale by DEWEY & CO., San Francisco

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We guarantee our COMPOUND to remove all scale and prevent any more being deposited. The COMPOUND forming a glazed surface on the iron, to which no scale will adhere and which preserves the iron.

The preparation is strictly vegetable, and is warranted to do all that is claimed for it without injury to the metal. Send for a circular.

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Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

SULPHURETS.

Clean Concentrations wanted. A party from the East having a process for working low-grade Sulphurets, will commence purchasing the same as soon as assured of an abundant supply. Gold-bearing Sulphurets preferred, having an assay value of \$20 per ton, or upwards. Address, A. B. WATT, P. O. Box, 2293, San Francisco.

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San Francisco Pioneer Screen Works

J. W. QUICK, MANUFACTURER.

Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to. 32 Fremont Street, San Francisco.

NOTICE TO MINE OWNERS.

THE PACIFIC MINING AND REDUCING COMPANY, whose works are located at 410 Ritch Street, and whose General Office is at 413 California Street, would respectfully announce to owners of mines of rebellious ores that they will either purchase for cash or receive ore for treatment at their works.

JAMES W. BURLINO, Secretary.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR THE WEEK ENDING MARCH 13, 1883.

273,804.—TWO WHEELED VEHICLE.—J. A. Ritz, Pleasanton, Cal.
273,839.—STOP VALVE.—Thomas Hennessy, Oakland, Cal.
273,863.—BOX FASTENER.—S. & M. E. Martinelli, Watsonville, Cal.
273,865.—RAILWAY SWITCH.—William McCall, San Francisco.
273,885.—FURNITURE PAD.—J. C. Pelton, Jr., San Francisco.
273,882.—GAS MACHINE.—G. P. Judd, San Francisco.
273,901.—STEAM COOKER.—Anna Sherman, Alameda, Cal.
274,060.—PORTABLE TANK AND PUMP.—N. Virelich, Stockton, Cal.
273,923.—CAR AXLE BOX.—C. M. & R. M. Wood, Healdsburg, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

PORTABLE TANK AND PUMP.—Nicholas Virelich, Stockton, Cal. No. 274,060. Dated March 13, 1883. This is a combined portable tank and pump. It consists in a tank of peculiar construction, mounted on low wheels and having combined with it, and inserted within it, force pumps at each end, the whole machine being adapted to be drawn from place to place. Under the tank is a small furnace. One of the most important uses of this device, and that to which it is more particularly intended to be applied, is an insect destroyer and exterminator. It can be filled with the compound necessary to sprinkle the plants and trees, and be wheeled among them with ease and the liquid thrown upon them. The furnace and upright flue may be made to keep the contents warm. If the liquid be of such a nature as to injure the plants if left upon them, some of the compartments may be filled with it and some with pure water, which latter may be used to wash off the plants. If the device is used in cold weather, the liquids may be warmed, and when the trees are sprinkled with it the insects may be induced to come out, when they may be destroyed.

WATER-WHEEL BUCKET.—Charles D. Smith, Amador City. No. 272,592. Dated Feb. 20, 1883. This invention relates to a new and useful bucket for water wheels of that class which have their rims formed with, or have bolted or secured thereto, flanges or buckets, which receive the impact or force of a stream of water under pressure. The invention consists of a hollow or chambered bucket, provided with a central opening to receive the water, and separate and distinct discharge opening at the ends through which to discharge it outside of the plane of revolution of the wheel. The object of the invention is to utilize the entire body or stream of water by so receiving and directing it as to avoid all splash, and cause it to exert its force to the best advantage. The object may be better seen by a brief reference to the points to be observed in the construction of wheels of this class. In the formation of these buckets or flanges, two main points have heretofore been considered. The first is the impact of the stream, and the second is discharge. A good surface may be presented to the water, but the bucket may be so constructed as to hinder its discharge, which, by not being readily freed, retards the progress of the wheel. In like manner, the buckets may free themselves easily, but may not receive the stream to the best advantage. To these two points a third may be added—namely, the splash. No matter how readily the buckets may free themselves, there must be more or less splash on account of the force with which the water is directed upon them, and this splash not only takes away from the resulting or continued force of the water, but is an actual hindrance to evolution. In the construction of this bucket, this inventor claims that he gains all the advantages described in receiving and discharging the water and avoiding all splash.

PISTON WATER METER.—Frank Walker, Tombstone, Arizona. No. 272,607. Dated Feb. 20, 1883. This invention relates to a new and useful water meter of that class in which reciprocating pistons work in a cylinder of known capacity. The invention consists in a novel valve and valve chamber, and the arrangement of parts therein whereby the pistons are operated and the valve reciprocated longitudinally, and it further consists, in connection with the valve and valve chamber, in a slotted connecting rod between pistons, and an intervening lever valve whereby the strokes of the piston are transmitted to the register.

WHAT gives a healthy appetite, an increased digestion, strength to the muscles, and tone to the nerves? Brown's Iron Bitters.

Notes From Eureka, Nevada.

[From Our Regular Correspondent.]

Since a change has been made in the Albion management, a feeling of greater security has taken the place of distrust, and people here believe that under Mr. T. J. Read's management the mine will be made to work out its own salvation. Since the Albion mine was shut down, I notice that a large number of Ruby Hill miners have either started out among the neighboring hills to

Prospect Mines for Themselves, or have leased those of other persons and commenced work upon them, hence I presume that out of our troubles will come some good.

Great surprise has been manifested at the drop in Eureka Con. stock since an assessment on it was announced. It is not generally known that there has been very little change in the output of the mine during the past 18 months, but such is the case. The assessment, I judge, was levied for the purpose of paying the balance on the new machinery, which works smoothly and with very little hindrance. An accident that occurred yesterday to one of the men in the Locan shaft, which happened while the men were shifting the hydraulic pump, was not due to breakage, or anything that has or will have the effect of stopping the regular working of the machinery. The shaft is being carried down with usual regularity, and when it reaches the depth of 1,200 feet, a station will be cut, and a new level run out under the old works; then I believe that Eureka Con. will take a new lease of life.

At the Richmond Mine

I saw some splendid-looking ore on Friday last, and was told that it would work over \$400 per ton, three-fourths of that amount being gold. There are no large bodies of this quality of ore, but they are often encountered.

At the Eureka Tunnel

The output of ore at present is at the rate of eight tons per day. The average of quality is about the same as usual. During the past week a raise has been made from the old south drift, main tunnel level, from a point where the first ore body was discovered. This is now in similar ore to that. The body, as far as developed, is about four feet thick and ten feet wide. It gives promise of making into a good-sized chamber. The engine shaft, 100 feet west of this point, is down 75 feet. It is still in very favorable limestone carrying small seams of ore. The No. 3, west drift, 105-foot level, which is to connect with it, is in 30 feet; also is in very favorable limestone carrying small seams of ore. The Addison chamber, just beneath this point, is producing some very rich ore, also a considerable quantity of lime rock so impregnated with metal that the mass is shipped for second-class ore. Some beautiful-looking carbonate ore is coming from the south drift, 105 level, and from points just below it. It makes in small seams and hunches. These, however, may concentrate at greater depth into one larger body.

The "Silver Connor" Mine,

On the west side of Prospect mountain, is still looking well. This is a property that in the hands of a wealthy company would be made to pay good dividends. There is a neat little hoisting engine at the main shaft, which is down 350 feet. It is of a capacity to prospect the mine to a depth of 600 feet. From the bottom of the main shaft is a drift run to connect with the main ledge, which was followed down 45 feet to where it makes a break. Above the break is a chamber about 25 feet high, and 10 or 12 feet wide, already worked out. In approaching this there still remains a fine looking body of quartz four feet in thickness, that will work at the rate of \$200 per ton. Above and all around this are several holes, worked through in ore, and feeders appear to be going off in every direction from it. From this level the winze is continued down 75 feet in ledge lime rock, and from the bottom of it a drift has been run in a southwesterly direction several feet to where the ore is again coming in on a well defined wall. Here, also appears the best possible signs of rich ore—iron and copper stains. Northward from here is also good evidence of the ledge making downwards, a winze down about eight feet being full of ovals containing rich, soft, yellow carbonate ore. On the foot level is a fine body of low grade ore, 25 feet wide by 30 thick, which rises, as shown by an incline winze, some 75 or 80 feet towards the surface. This will work from \$30 to \$40 per ton, and throughout the mass appears small pockets of very rich ore, showing in places free gold, which is not of frequent occurrence in this district. There is exceedingly little lead in the Silver Connor mine, the ore being somewhat of a milling nature. It carries three fourths of its metallic value in gold.

The Williams Mine.

Which adjoins the Silver Connor, is a property fully its equal in value, and has exceeded it in point of production. At present there are only four men at work in it. They are employed cleaning up an old stope at the 130 level, the last shipment of ore from which worked at the the furnace \$80 per ton. The ore from the mine usually works from \$94 up to \$130 per ton, its principal value being in gold. The mine has been opened to a depth of 350 feet, and has paid

expenses from top to bottom. The fissure in places is 30 feet thick between the walls. This property was bonded for sale to an English company a few months ago, but the sale was not consummated. Negotiations failed in this case, like in many others, as I hear, because of an insufficiency of blood money. That such a goulshish system has been practiced here, the most glaring proofs exist and show; and if intended purchasers would send special agents to Eureka, who would make it their business to inquire privately into the character of their confidential agents, they would not place the most implicit reliance on their reports. The Continental and Independent mining claims, lying immediately north of the Golden Rule series of mines, were sold recently to Mr. J. Kincaid Smith, of London, England. The consideration is not known to the public, but is supposed to be about \$10,000.

The Seventy-six Mining Company

Have bonded the Eureka, Keystone, Seventy-six, Clipper, Stella and Uncle Sam claims, all situated in New York canyon to Dr. Francis D. Mueller, of San Francisco, for \$100,000. Many shipments of very high grade ore have been made from this property. Large quantities of secretions from the Richmond furnaces, that in years past have been thrown over the slag dump, are now being resmelted at a good profit to the company. Large masses of this have the appearance of raw ore from the mines. Smelting operations at the Richmond furnaces were never conducted with such intelligence and economy as at the present time. The feed floors, which were comparatively bare 18 months ago, are not alone covered from one end to the other with custom ores, but the yard is so crowded with the same as to scarcely allow room for the haulers to pass. I should not be surprised to hear that the company will start an additional furnace at an early date.

Good reports are coming in from

Secret Canyon District.

New companies are to be formed for the purpose of working mines in that locality. Several new locations have been made during the past two weeks in Pinto district, particularly at a point between Silverado mountain and Alhambra hill, where some very fine croppings have been discovered. Assays run from \$15 up to nearly \$500 per ton in silver. The low grade ore also carries 25 per cent. of copper. It is difficult to say at present for which of the two metals the claims will be the most valuable. Work has been resumed upon the Sweet-water mines in White Pine district, owned by a wealthy New York Co., represented by Mr. Eugene N. Robinson, of that city. He appears to be a careful manager, and with his assistant, Sam. Paul, a thorough going miner of many years practical experience, I have no doubt that operations upon these properties will be attended with success. M. H. JOSEPH.

News in Brief.

THE new two-cent stamp will bear the profile of Washington.

HUGH J. MOHAN has been appointed Secretary of the new Labor Bureau.

It has been decided to erect a crematory in Chicago to cost \$100,000.

PENNSYLVANIA farmers are paying a reward for the English sparrow's head.

THE Mare Island Navy Yard employes will commence working ten hours a day on and after Thursday.

THE French Government will soon introduce a bill in the Chamber of Deputies for the relief of distressed working men.

SOMETHING unusual in the brief history of Wood River is the remarkably early spring and open season that is now experienced.

A CATTLE owner of Texas is about to inclose a pasture with 50 miles of wire fence, 60 miles miles east of Laredo, along the line of the Texas Mexican Railroad.

THE United States steamship *Ranger* is all ready to return to the Southern coast and resume surveying there. The injuries she sustained from striking on a rock have been repaired.

SECRETARY TELLER has requested the Secretary of War to detail a military guard for protecting the Yellowstone Park property. Secretary Lincoln promised to comply with the request.

THE distillers of grapes and wine in the Los Angeles Internal Revenue District are 38 in number. Of this amount, 15 have closed up business for the season, and 23 are still going, but are nearly ready to close up.

MAX THOMPSON, the young train robber who assisted at the robbery of the train at Austin, Texas, a few days ago, was captured and jailed. All four of the young rascals are now in jail. The youngest is 13, and the eldest is only 16.

THE people of St. Louis are apprehensive of a cholera epidemic during the coming spring. They had cholera in 1849 and 1866, in each case preceded by high waters in the Mississippi, and another 17 years have come about.

CHEAP ORE PULVERIZER.—There is for sale in this city, as will be seen by our advertising columns, a second-hand Rutherford Pulverizer, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it.

No Whiskey!

BROWN'S IRON BITTERS is one of the very few tonic medicines that are not composed mostly of alcohol or whiskey, thus becoming a fruitful source of intemperance by promoting a desire for rum.

BROWN'S IRON BITTERS is guaranteed to be a non-intoxicating stimulant, and it will, in nearly every case, take the place of all liquor, and at the same time absolutely kill the desire for whiskey and other intoxicating beverages.

Rev. G. W. RICE, editor of the *American Christian Review*, says of Brown's Iron Bitters:

Cin., O., Nov. 16, 1881.
Gents:—The foolish wasting of vital force in business, pleasure, and vicious indulgence of our people, makes your preparation a necessity; and if applied, will save hundreds who resort to saloons for temporary recuperation.

BROWN'S IRON BITTERS has been thoroughly tested for dyspepsia, indigestion, biliousness, weakness, debility, overwork, rheumatism, neuralgia, consumption, liver complaints, kidney troubles, &c., and it never fails to render speedy and permanent relief.

DEWEY & CO.

SCIENTIFIC PRESS

AMERICAN AND FOREIGN

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Inventors MODEL MAKER.
258 Market St., N. E. cor. Front, up-stairs, San Francisco
Experimental machinery and all kinds of models, tin, copper and brass work

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE
Northern Belle Mill & Mining Company.

San Francisco, March 10, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 70, of fifty cents (50c.) per share, was declared, payable on Thursday, March 15, 1883. Transfer books closed on Monday, March 12, 1883, at 3 o'clock p. m.

WM. WILLIS, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 300 Montgomery Street, San Francisco, Cal.

NOTICE OF THE APPLICATION

—OF THE—

South Comstock Gold & Silver Mining Co.
For Dissolution and Disincorporation.

Notice is hereby given that the South Comstock Gold and Silver Mining Company has this day filed with the Clerk of the Superior Court of the City and County of San Francisco, an application for Dissolution and Disincorporation, and all persons desiring to file objections to such application are hereby notified to file such objections within thirty days after the first publication of this Notice.

March 8, 1883. WILLIAM T. SEBASTON, Clerk.

Date of first publication, } O. Z. SOULE, Deputy Clerk.

March 16, 1883. } WHITE MORE & McKEE, Attorneys for Petitioners.

H. H. BROMLEY,
Dealer in Leonard & Ellis Celebrated

TRADE MARK



STEAM CYLINDER AND MACHINE OILS,
The Best and Cheapest.

These Superior Oils cannot be purchased through dealer and are sold direct to consumer only by H. H. BROMLEY sole dealer in these goods.

Reference—Any first-class Engine or Machine Builder in America. Address, 43 Sacramento St., S. F.



The "Garland" Patent SEWER GAS TRAP

Is a sure shut-off against Sewer Gas and Back Water. The Loaded Metal Ball Valve is slightly heavier than water. This Trap can be put in at small expense, and is warranted to give satisfaction. Highly recommended by leading Architects and Plumbers. Used in all new, first-class buildings in San Francisco, including Phelan Block. For sale by all dealers in Plumbers' Goods, and by the "GARLAND" IMPROVED SEWER GAS TRAP MFG CO., 1901 Broadway, Oakland, Cal. Coast Rights for sale.



\$3.85

This cut represents a No. 1 CALF SKIN SHOE, made in GAITER or LACE—all sizes, which we are manufacturing with a view to meeting the wants of a large class of people who must have the best shoe for the least money. It is guaranteed as to STYLE, FINISH and QUALITY, and will compare favorably with any \$6.00 shoe in the market. In order to introduce our goods, we will send FREE to any address for the LOW sum of \$1.00 a pair, thereby saving to the consumer the large profits of the jobber and retailer. TRY ONE PAIR AND BE CONVINCED.

F. H. WILSON, 223 West Baltimore St., Baltimore, Md.

Remit by Registered Letter or Money Order.

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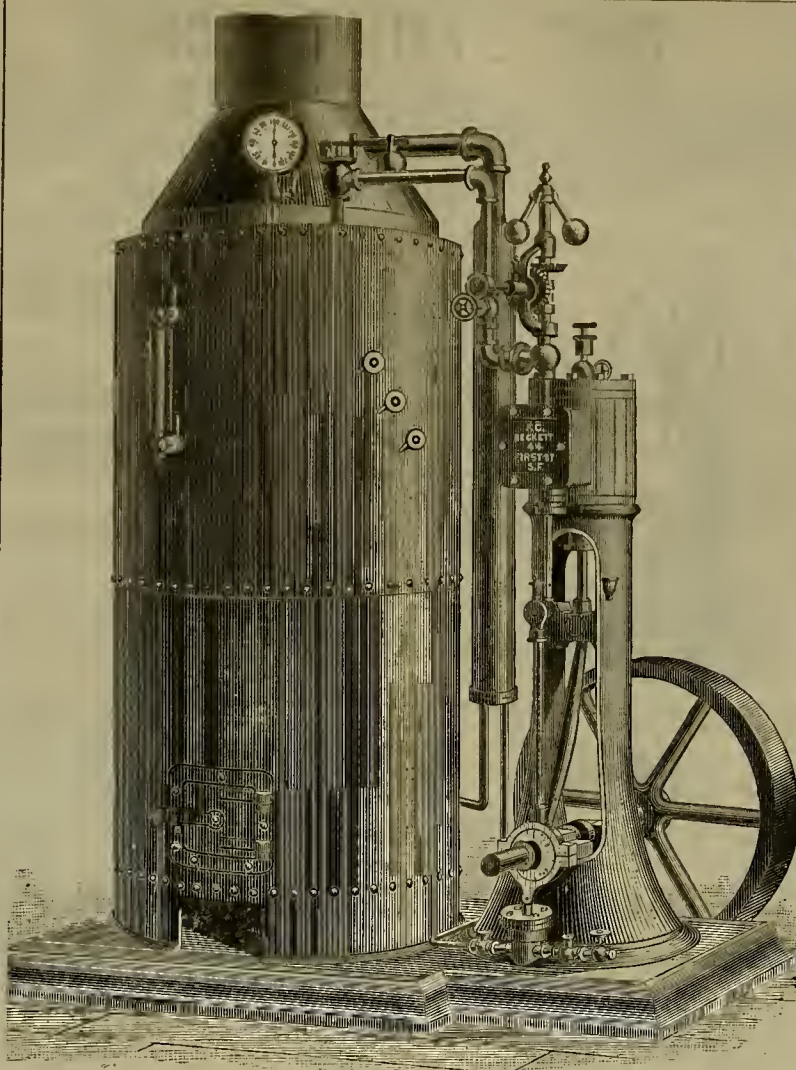
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VERTICAL AND HORIZONTAL ENGINES AND BOILERS,
FROM 2 TO 90-HORSE POWER.

Improved Hoisting Engines, Engines for steam Yachts. Engines for pumping artesian wells and irrigating and farming purposes, and all kinds of Machinery.

Repairing Promptly Attended to.

No. 44 FIRST STREET, SAN FRANCISCO, CAL.

ANTI-SCALE COMPOUND

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We guarantee that, with proper use, this Compound will remove and prevent all INCRUSTATION IN STEAM BOILERS.

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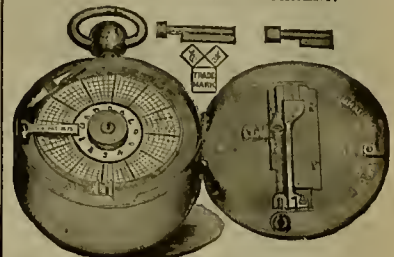
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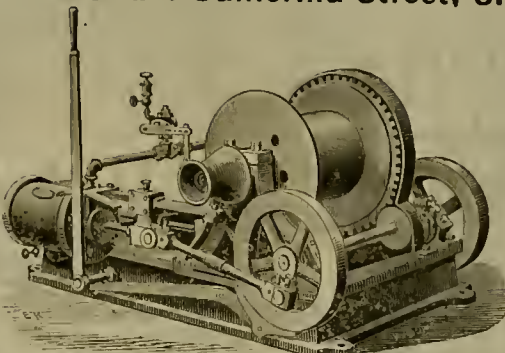
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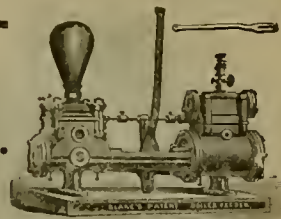
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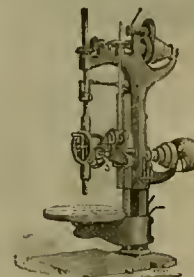
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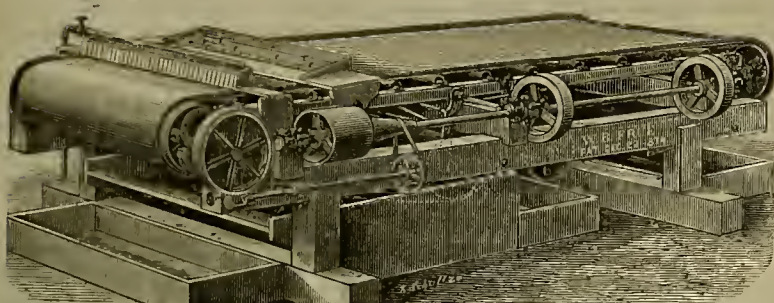
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That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ore is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

Room 7, 109 California Street, - - - - - SAN FRANCISCO, CAL.
Nov. 6, 1882.

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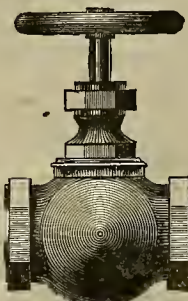
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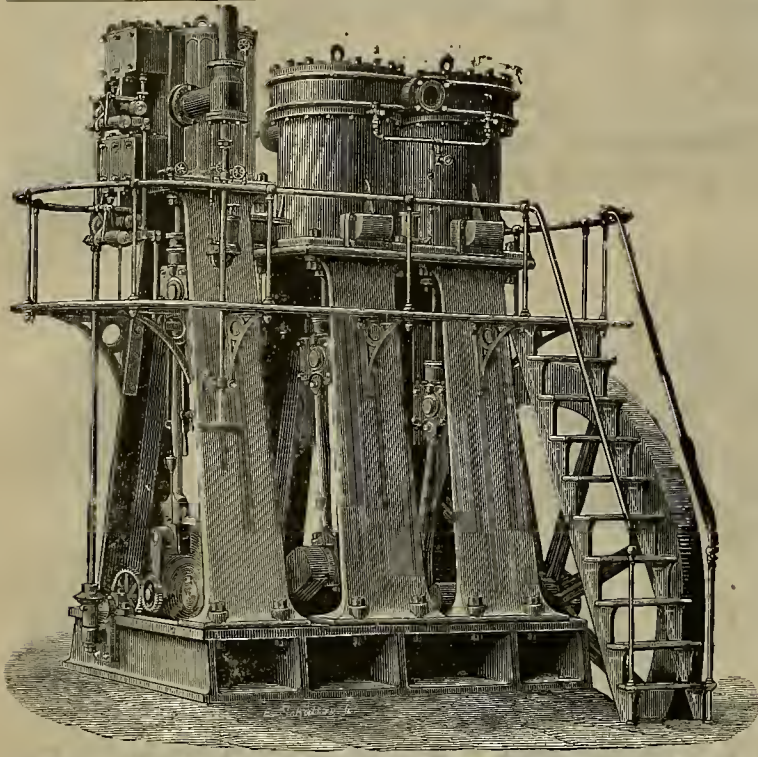
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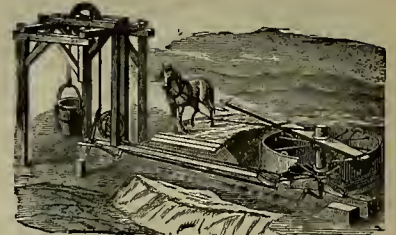
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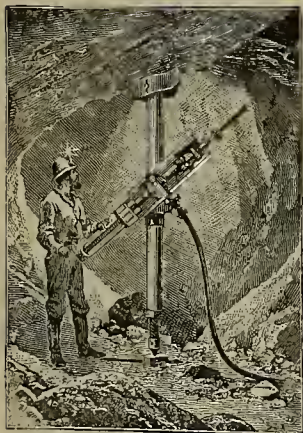
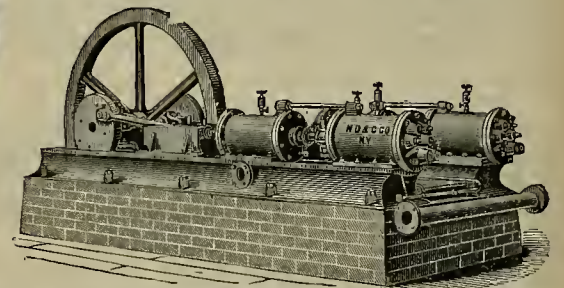
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BELT
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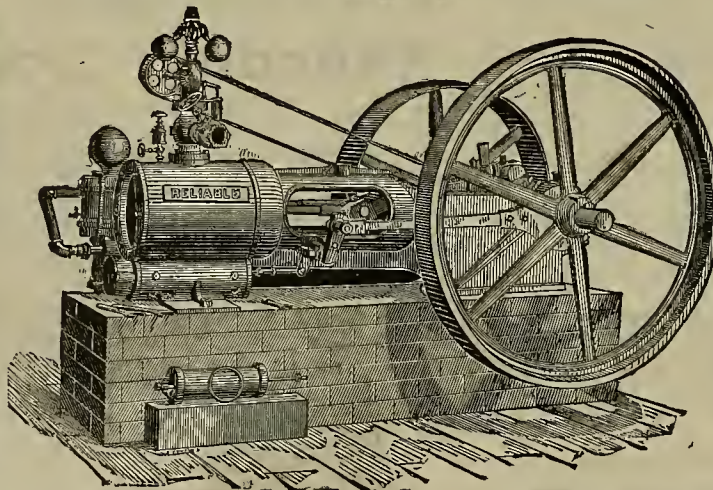
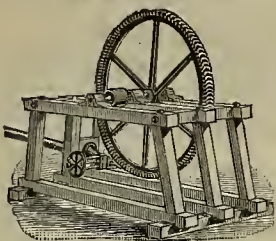
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Miners having reliable properties in California, and who are willing to give one-half of their interest in the same for suitable machinery, may benefit themselves by corresponding with me. **ALMARIN B. PAUL,**
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Our terms are cash in advance for this paper. NEW NAMES will not be entered on our printed list until payment is made. Feb. 1, 1883.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MARCH 31, 1883.

VOLUME XLVI
Number 13.

Smelting Copper Ores in Mexico.

Metallic copper is a product of native metallurgy in various parts of Mexico, and by somewhat varied methods. While recently examining copper mines in the State of Jalisco, Mr. Walter B. Devereux, E. M., of Globe, Arizona, had an opportunity of witnessing Mexican copper smelting by a process which is interesting from the fact that a fine quality of copper is produced from sulphurous ores in these metallurgical operations, and apparently without excessive loss. Mr. Devereux described the process at a recent meeting of the American Institute of Mining Engineers:

The process was carried on in buildings which were part of a plant erected by an American more than twenty years ago for the purpose of smelting and working copper. After a few years, this man met with accidental death, and the works have been but little used since. Located in the center of a high range of mountains, far from any town or seaport, and inaccessible except over difficult mule trails, these substantial buildings, filled with furnaces and heavy machinery, are a strange sight to be met with in one of the least advanced of Mexican mining regions. Under the same roof with English reverberatory furnaces and calciners, the crude Mexican furnaces yield a few small cakes as a daily product. The ore comes from a large vein not far distant, and consists of a quartzose gangue, containing about five per cent. of metallic copper in the form of copper pyrites (chalcopyrite). This is pounded by hand until it will pass through a sieve of rawhide with one quarter inch holes. It is then subjected to a rude concentration in a trough through which water is flowing. The concentrated product yields, when smelted, about thirty per cent. of copper. It is first roasted in one of the old calciners in the works, although when necessary the Mexicans construct smaller furnaces, which answer the same purpose. After roasting, the ore is smelted in, or with, the furnace shown in the sketch, which constitutes the peculiar feature of the process. This furnace consists essentially of a pair of air channels or long tuyeres, constructed in the top of a mass of rude masonry, with a bellows at one end, and what answers to a crucible at the other. In detail, these stone channels are about seven feet long, slightly conical, and sufficiently raised at the back to allow free motion for the bellows. The fire ends are terminated by nozzles about eighteen inches in length, and two inches in diameter at the outlet. The ends of the nozzles come nearly to the edge of a circular basin, about eighteen inches in diameter and three in depth at the center. The basin is simply a depression in the earthen floor lined with the ashes of the *encina*, a species of oak. The ashes are rammed in moist, and then a smooth and true spherical surface is formed by a man stamping quickly around the basin with leather sandals on his feet. This basin is repaired, when necessary, in the same manner.

For each tuyere there is a round bellows about three feet in diameter, which is attached directly against the stonework at the back. The construction is similar to that of an American round bellows. The back of the bellows is fastened to an upright frame, which is hinged at the bottom, near the floor, and is provided with a cross-piece at the top for a handle. Each bellows is worked by a single man, who stands on a raised platform, and takes a single step backward and forward at each blast. The blasts are given nearly alternately, and the two currents are directed by the nozzles toward the center of the basin.

When smelting is to be commenced, a green pine pole, about ten inches in diameter, is laid across the basin in front of the nozzles. The fire end of this is supported by a roller, so that it can be moved up easily. Pine charcoal is piled upon both sides of this over the basin, and plates of foul slag are laid across from the nozzles to the charcoal. By these contrivances a greater concentration of heat is obtained. When the fire is well lighted, ore is placed on that part of the charcoal outside of the log, and coal and ore are afterward added sufficiently fast to maintain

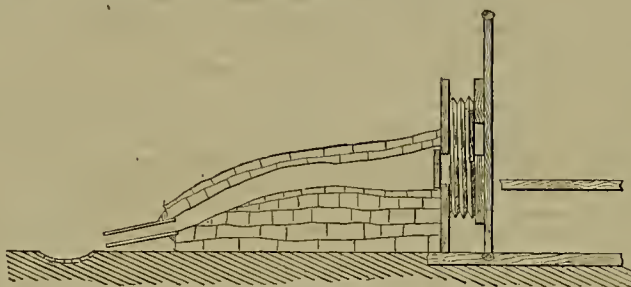
the compact character of the pile. By this means the blast is prevented from breaking through with force and blowing the ore away. The blast is quite powerful, and the flames are constantly tinged with green. The *encina* makes a stronger coal than pine, and better for shaft furnaces, but it snaps too much for this process. By the time the ore has worked down to the bottom of the log, it seems to have agglutinated, and the melting copper and slag commence to drop at once. The whole of the smelting seems to take place before it settles into the basin, as after that the surface is almost constantly covered with charcoal. The log seems to be an essential both for controlling the force of the

blast, and for supporting the charge so that it is acted upon gradually, but with increasing power. When the basin is nearly full of slag the blast is stopped and the coal scraped away. The slag is then removed in plates as it cools, the only implement being a round pole, which is slipped under the edge, and then carefully lifted up with the cake balanced upon it. If the cake of copper is not large enough, smelting is resumed, and when sufficient copper has accumulated, the slag is removed as before, the dust blown off with a bamboo tube, and the copper allowed to cool in the basin.

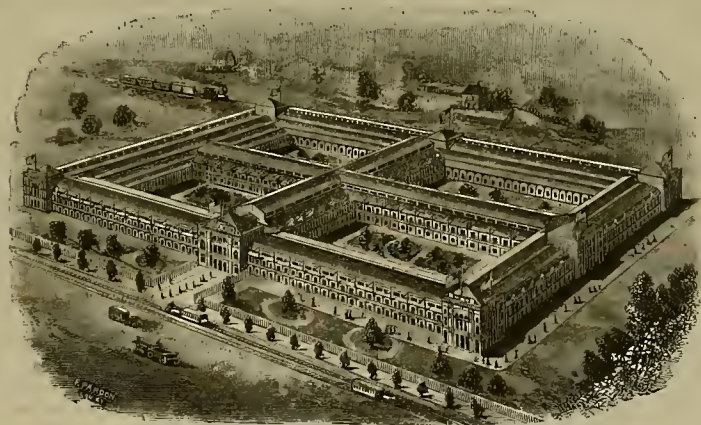
It is said that 300 pounds of ore can be smelted in one furnace in four hours, but I

from the surface of the copper. A glance seemed to satisfy him, and, nodding to his assistants, he turned to me, and said with a very tragical air, *yo lo garantizo* (I guarantee it).

The cakes are made of the desired size, and allowed to cool in the basin until perfectly solid. Those intended for kettles are sold as they are, while those intended for sheets (about 125 pounds weight) are rolled in the mills of the old works. They seem to roll without flaws or cracks, and to produce an excellent product for sugar pans and stills. This rolling mill is a curiosity. The mill first sent out soon broke, and the American who inaugurated the enterprise recast the rolls and pinions of solid bronze of such strength that



MEXICAN COPPER SMELTING FURNACE.



THE SOUTHERN EXPOSITION BUILDING.

think that a considerably longer time is required. The cakes are made of forty to fifty pounds weight.

The quartz gangue separated in concentration is used as a flux. The slags are very basic, but are well fused, and seem to contain a little metallic copper.

It is interesting to note that in the rude appliance described we have all the principles involved in a shaft furnace: the gradual supply of ore and fuel, which gradually pass through increasing degrees of heat to a zone of fusion; the subsidence below into a receptacle where the metal and slag separate; the bellows and tuyeres; these are all the essentials. If in this furnace we simply remove the log, pile a few bricks around the basin, and cut an outlet at the bottom, we have at once a type which can by simple amplification, develop into our most complete shaft furnace.

The cakes of copper produced are soft, and

The Southern Exposition.

Frequent improvement on machinery in use, the introduction of new machinery for new purposes, and the rapid expansion of our manufacturing industries, seem to require periodical National Expositions, in which improvements and new appliances may be exhibited. Selling manufactured articles by sample, through the agency of commercial travelers, is now a well-settled custom of our country; but the maker of machinery and heavy implements cannot so conveniently show his samples, and the periodical exposition is, therefore, becoming a necessity to him.

The local Exposition has served a good purpose, and within its limits will continue to do so; but the easy and rapid transportation that now brings all parts of the country together, and the consequent extension of successful business enterprises into every city and every quarter have given greater scope to these representative exhibitions, and made a periodical National Exposition one of the great requirements of American industry. With that quick adaptability to surrounding conditions and new requirements which characterizes our people, this new form of exhibition has at once drifted into the proper channel. Paris may be France, but no city on this continent can be America. Our territory is too large, and the several sections of the country too well defined in their interests, their power, and their character, to leave any one city the great center which must draw to it every undertaking of conspicuous magnitude. By common consent the National Exposition is becoming a movable industrial feast, as to its location, with regular periodicity as to its time.

It had been thought that two or three years' preparation was necessary to an exhibition like that proposed at Louisville, but the Southern Exposition, to open there on August 1, has already demonstrated that where there is a strong will in such things, there is a quick way. When the project was definitely proposed, without any delay, a popular subscription furnished all the means required. An organization was promptly effected, the work of preparation at once begun, and already so much space has been engaged in the machinery apartment that the managers are compelled to extend their exhibition space beyond the original thirteen acres of building.

The engraving gives a good view of the extensive building in which the Exposition is to be held at Louisville. At highest elevation on Fourth street the building is 75 feet, but it is over eight times that wide, and it is twelve times that long. On each of the four sides will be a handsome entrance, and at each corner of the building there will be ornamental towers. Around the interior of this building runs a gallery, the length of which is over 3,000 feet, or over three-fifths of a mile.

The ent shows four courts; each contains half an acre. These are principally for light and ventilation, though they will be handsomely ornamented and used possibly for refreshment stands.

To the north of the building lies Central Park, containing 18 acres, and a magnificent growth of forest trees. This park will be under the management of the Exposition Co., and it will add greatly to the pleasure and comfort of all visitors.

Street cars pass out Fourth street on the east side of the grounds, and out Sixth street on the west side, and in this way the Exposition can be reached by a few minutes' ride at a cost of five cents. Both these streets, it is expected, will be illuminated by electricity. Within the building every comfort will be provided for visitors. Waiting rooms, reading rooms, telegraph offices, post-offices, ticket-offices, will all be conveniently located.

The report of Superintendent Regua, of the Chollar mine, states that the work done on the 2900 level proves that the precious metal does not exist there.

Persons just down from Boise City say three stages leave there daily for Wood River. The stages are nearly always loaded with passengers.

CORRESPONDENCE.

Keep the Slickens in the Mountains.

EDITORS PRESS:—The advantages of irrigation on the red foothills of the Sierra Nevada are well illustrated here about Smartsville, where are to be seen hundreds of acres of alfalfa, clover and other cultivated grasses kept green and growing the year round through the skillful application of a moderate amount of water. A little below the town Messrs. Pierce, O'Brien and McGanney own a large tract of land situated in the scrub oak belt that borders on the rolling prairies, which, subsiding toward the west finally sink into the timberless valley of the Sacramento. This land is not particularly rich, possessing the red, Edom-like soil, common on this west-lying slope of the Sierra. Yet, with moderate irrigation and careful tillage, it has been made to produce heavy crops of grain and vegetables of all kinds, the hay lands being mown several times every year. A large number of horses and cows are also pastured on this land, besides a good many hogs, fed in part on the alfalfa and clover. The animals kept here are, for the most part, of choice breeds, some of them very select.

While the profits realized from this land are sufficiently large to make it a good investment at the rate of \$100 per acre, unimproved land equally good commands about here only from \$5 to \$10 per acre. This land never disappoints the owner. Be the rainfall excessive or insufficient, there is no failure of crops, there being always snow enough in the mountains to afford plenty of water, the element on which the crop wholly depends. There are in this region no storms or frosts, no rust or blighting winds to hurt. With enough of this muddy water, for such it is, the success of the farmer, the orchardist, the horticulturist and the vintager is assured, nor does it require such a very great deal. Mr. James O'Brien, to whose charge this business has been committed, informs me that the quantity of water required for irrigation, after the first few seasons, becomes every year somewhat less. The owners of this property have for many years been engaged in hydraulic mining at this place; the water employed for irrigation being such as has already been used for gravel washing. Before being conducted upon the land, however, it is retained for a time in reservoirs, or run for a considerable distance in ditches, whereby the coarser material held in suspension is allowed to settle. Though still rather turbid, it answers well for irrigation, better perhaps, than if it was perfectly pure—the fine particles it carries being valuable as fertilizers. Conveyed upon the land in large quantities as it issues from the miners' sluice, this stuff becomes an agent of mischief, as witness the harm worked the lands along the banks of the Yuba further down.

Smartsville

Is probably the most pleasant mining town in the State, rendered so, mainly, through the extent to which the inhabitants, by means of irrigation, have improved and beautified the grounds about their dwellings. The most of the residents of this place have not only orchards and gardens, but, also, patches of cultivated grasses sufficient to keep a cow or two. The homestead of Mr. O'Brien comprises 10 or 12 acres, a part planted to choice fruit trees, vines, etc., and a part consisting of irrigated pasture and hay lands. Mr. Daniel McGanney has an equally large and attractive place, it being the finest to be seen any where in the mining regions of the State.

Coming from the mountains, one catches glimpses of Smartsville a long way off. So seen, from a distance, these patches of verdure about the place, and the green fields further down, are a pleasant and refreshing sight, especially in the summer, when the red dust lies deep on the highway, and the whole country is burned to a crisp.

In such use of this turbid water from the mines, we have an example that ought to find extensive following, there being many places along this great piedmont country where it could be repeated with good results all round. Properly distributed, this water, instead of causing injury to the already fertile valley lands, would cover these russet hills, now so arid and barren, with orchards, meadows, and fields of grain.

H. DEEROT.

Smartsville, Cal.

THE New York & Utah Mining Company are about to begin operations again. Mason M. Hill, manager of the affairs of the company in Utah, lately arrived from the East, and is perfecting plans to start the smelter belonging to the company. This smelter is located in the valley at the foot of Bingham Canyon.

ROGERS' DISTRICT, A. T., is excited over the rich strikes. The World Beater bids fair to beat the world. They are taking out at the rate of one ton of ore per day to each man, some are running from \$400 to \$1,600 per ton. Each man cleans at least \$150 a day, says the *Pinal Drill*.

WOOD RIVER reports everything well and promising. When the season opens and the railroad gets through, the output of bullion will begin in earnest, and will not slack.

A REPORT from the diamond mines at Kimberly, South Africa, says that last year diamonds were shipped to the value of \$20,000,000.

A Great Legal Warfare.

The Contest Between the Land Owners and the Hydraulic Miners—The Equities and Hardships on Both Sides.

(Concluded from our last issue.)

Inactivity and Remissness of the Farmers

Warned by the mischief resulting from the flood of 1861-62, and incited by its partial repetition every year thereafter, these injured land owners, it would naturally be supposed, would have hastened to adopt decisive and effective measures for preventing the miners from further dumping their tailings into the creeks and rivers above; yet, strange to say, no such action was taken by them until the spring of 1877; and this, notwithstanding the injury since complained of, was all the while going on, and the miners, instead of abating their energy, were opening more claims, building new and larger ditches, employing more powerful washing apparatus, and otherwise extending and intensifying these agencies of mischief. It was, in fact, during these 15 years of inaction and seeming indifference on the part of the farmers that most of the heavy investments on account of hydraulic mining were made, the amounts so expended having aggregated them \$40,000,000 or \$50,000,000.

The North Bloomfield Company alone disbursed in this time nearly \$4,000,000 in the purchase of mining grounds and water franchises, and in the construction of ditches, tunnels, reservoirs, etc. This, too, was the period when English funds went into the business quite freely, something like a million dollars having been expended with the expectation on the part of the investors, and under an implied guarantee on our part, that the business was to go on unmolested. By reason of their slothfulness and silence these farmers, it is contended, have been guilty of such laches as should defeat their claim for relief in the manner asked for, and even deprive them of any standing in the courts. They suffered us to go on, say the miners, and waste all these years and lay out all this money, and just now when we have overcome the many obstacles incident to the business and worked it up to a paying point, they jump upon us and ask the courts to restrain us from further operations.

The money invested in what may be termed live mines, that is, such as are now making an active and generally a profitable production, amounts to between \$60,000,000 and \$70,000,000. This money, which has gone for the purchase and outfitting of mining properties, has all been expended in good faith, the miners never suspecting for a moment that their right to employ the outletting streams, after such long use and its sanction by law, would be called in question; least of all by a class of men who, during these many years had, by implication, been assenting to what they were doing.

These parties, say the miners, who are now pursuing us in the courts, are

Inconsistent as well as Unjust.

They went upon these lands informed as to the claims of the miners, and ought not now to complain if the latter resist their demands and combine to defend what they believe to be their just rights. They failed at the proper time to notify the miners and the investing public of their grievances and of their intention to seek redress through recourse to litigation. When the fatal slums first began their encroachments, these land owners neglected to throw up such slight levees as, with some little additions every year, would have served to keep this stuff in check; sitting down listless and idle until the evil had spread beyond control.

Besides, say the miners, we did not lay the foundation for the trouble complained of; this was mostly the work of our predecessors, who accomplished it in the manner already indicated. Then, too, the soil over six millions of acres of land throughout the country tributary to these rivers and their confluents are now being plowed, or otherwise stirred up, sending down immense quantities of sediment; more, perhaps, than has of late years been discharged from the hydraulic mines. Here is an agency potent for evil but of which little has been heard, though it ought to bear its just proportion of the injury done. A majority of the hydraulic companies at present operating—the most of the loose top dirt having long since been run off—are now at work on the cemented

gravel below; more than half of which consists of bowlders that never leave the washing pits at all, while a large percentage of the tailings are so coarse that they lodge before getting very far from the mines. Of material fine enough to be transported for any great distance much less is now discharged than formerly.

Moreover, the mass of the tailings at present resting in the river channels, has so spread out that the shallow current of water running over them has not force enough to carry anything but the finer silt 'down' as far as the farming lands; and this material, a great deal of which is floated into the lower hays, and even out into the ocean, is so fertile, so fine, and so small in quantity, that it can cause but little damage should some of it be left on the land.

Should another great flood occur, it would not now be likely to disrupt and carry down stream the debris lodged in the river beds, as this stuff has not only so spread out as to greatly diminish the force of the water, but it has become so impacted that even the extremest flood would hardly suffice to tear it up.

The fear that hydraulic mining will be greatly extended hereafter is not well founded. This business must always be limited by the quantity of water available for carrying it on; and as very nearly such quantity has already been appropriated and brought into use, this industry can undergo but little expansion in the future.

If the water in the rivers is to be preserved clear and uncontaminated, as many of our opponents contend that it should be, then, say the hydraulic men, there must be an end to all mining, as this cannot be the case if even vein or drift operations are suffered to go on. To establish the rule that suits may be maintained against any class of miners for rendering the water in the rivers turbid, or for depositing sediment in their channels or along their banks, would be to utterly extinguish every branch of mining, inasmuch as every branch, if continued, must necessarily contribute something towards producing these results. It avails not that the farmers disclaim any purpose of proceeding against the quartz and drift miners. Already some of the latter have been threatened with suits, and let but the above doctrine prevail, and the ruin of every class of miners would be speedy and inevitable, as any one, however small his damages, might bring suit against them.

If the rivers, during high stages of water, overflow their banks, this is no new thing, as they have always done so. When extreme floods occur, the channel of the Sacramento is able to carry but a small portion of the water brought into the valley, from three to four fifths of the whole spreading out over the tule lands, on which it deposits great quantities of sediment to their great benefit.

While the bed of the lower Sacramento has been raised to the extent of about six feet, the bars in the river have been so little shoaled that a small amount of dredging would suffice to maintain its navigation unimpaired. As regards both the Sacramento and Feather rivers, their summer navigation, instead of being injured, has been improved through the operations of the hydraulic miners, the immense quantity of water stored in the mountain reservoirs, and discharged during the dry season insuring to these streams a better stage of water than formerly.

If the hydraulic mines are closed other very extensive and important interests will be made to suffer besides those of the miners themselves. In the first place, there is being turned out by this class of mines from twelve to fifteen million dollars annually. Their product consists wholly of gold and could not well be spared just now from the circulating medium of the country, as it constitutes about one third of the entire gold crop of the United States. With us the product of gold has for some years past been falling off at a rate calculated to seriously disturb the relative value of the two royal metals, and cause much uneasiness in financial circles. 'To cut off now this prolific and reliable source of supply could not fail to increase this uneasiness, and might even precipitate a crisis in our monetary affairs.

On the prosecution of hydraulic mining large communities are almost wholly dependent for their subsistence. To prohibit the business would nearly depopulate extensive districts now filled with comfortable homes and a well-

to-do people, the country, in the absence of mining possessing no other resources that could afford these people a livelihood. And so the miners reply to their opponents, and argue the question in their own behalf.

Judge Temple's Decision.

Under the decision rendered by Judge Temple the hydraulic miners who have been stopped from working their claims by injunctions issuing from the courts, may, as soon as they have made ample provision for impounding the coarser portion of their tailings, resume work and go on as before; the court refusing to hold that they may be enjoined from working their claims because of the injury done to the water alone. While this finding was only against a single company, it establishes a principle that applies to all hydraulic operations. To the principle so enunciated, the miners do not object. They are willing to abide by the findings of Judge Temple, most of the larger companies having already proceeded to build dams for the retention of their tailings. Some of the companies, however, decline to incur this expense until the decree of Judge Temple has been passed upon by the Supreme Court, to which the case has been appealed, and before which it is still pending. Should the decision of the Court below be sustained, these parties, conforming their action to its requirements, will also go on and make provision for impounding the coarser portions of their mining slums by building dams and reservoirs for the purpose.

It is the opinion of most experts that these receptacles will so far subserve the end for which they are intended that the Courts will feel justified in allowing the parties who build them to continue gravel washing. Meantime, all the hydraulic miners have kept at work except the few companies who have been enjoined from doing so; and those, like the rest, are either awaiting the action of the higher Court, or going on and constructing retaining dams in anticipation of a favorable decision.

The Probable Outcome.

The hydraulic miners profess to see through their compliance with this new policy an end to their trials and troubles. The farmers, however, regard the plan proposed by Judge Temple with some distrust, and it is probable enough that it will, even if carried out in the most efficacious manner practicable, fail to cure the evils complained of. But it will go a good way towards that end, and prove a serviceable auxiliary to such other measures as may be devised for its more full accomplishment, for it may be taken for granted that some method will be evolved for protecting the large interests imperiled by these mining slums other than the destruction of the mines themselves. To kill a great industry because its continuance will work some considerable harm to other interests, is not the American way of doing business. To so deal with even the most perplexing problems is not suited to the genius of our people. It is rather our way to exercise our ingenuity, tax the resources of science, experiment, compromise, and even practice a little injustice, if needs be, sooner than see a pursuit, built up at such a cost, so beneficent, so well entitled to live, strangled to death by judicial process.

This, it may be assumed, will not be done. Impounding reservoirs of immense capacity will be built in the mines. The outletting streams will be dammed at all eligible points. Ditches will be constructed for conveying these slums out and distributing them over the dry foothills and the barren prairies. Great flumes will be laid down for carrying them off and depositing them on the tule marshes, where they are greatly needed. This and much more of a remedial kind having been accomplished, the farming lands and the cities will be reasonably protected, the harbors will be saved, and the rivers preserved from shoaling, and hydraulic mining will, in all probability, be suffered to go on without further interruption.

M. BUTLER JONSTONE, an English capitalist and a heavy owner in the Broadway property at Silver Star, says the *Helena, M. T., Herald*, will resume operations shortly, and will erect machinery of a costly pattern, with which to treat the ore by a new method.

TUCSON, A. T., is lighted with masts, similar to those used in Los Angeles, with the large Brush arc lights, and the Swan incandescent light will be used for domestic lighting, the storage reservoir system being used.

MECHANICAL PROGRESS.

Resharpening Files.

The old method of giving files a second life was by rescutting. So far as this was confined to files with sufficient body to sustain the second assault, it may have proved to be economical. But there are many files used which are necessarily thin, and not capable of being reduced from their thinness.

To recut a file, the file must be ground down to the "plate," the smooth surface below the "roots" of the teeth. All the teeth must be ground out, and the space below the "roots" of the teeth also, if good afterwork is expected. And then it is only the thick files with fine cuts that are of any value for recutting purposes. With a coarse file, as a bastard, or a mill file, the blows of the cutter's hammer have disturbed the relations of particles in the slab of steel so seriously that they have almost disintegrated the steel before the hardening process had made the incipient cut of the chisel noticeable to sight or subject to fracture. So it does not always "pay" to anneal, grind and recut a worn-out file.

But the useful life of the file may be perceptibly and economically prolonged by proper care. Sometimes the teeth of new files are broken off before performing useful work by "bearing on" to a file, and attempting to rasp through the foundry skin of an iron casting. Sometimes new files are clogged with soft metals. In either case the trouble has been done before the file has had its chance. The newly cut teeth of the file should be protected from abuse. The file tooth is similar to the razor edge, and has a fringe of self-supporting fibers requiring the gentlest treatment at the first. After this "wire edge" is worn off—not roughly broken off—the file teeth are ready for their daily duty. To perform this they should be kept clean. It is not alone the finishing files, used with oil as a lubricant, which get foul with a gurry of oil and file dust, but there are dry used files which have lodged between their teeth slices of wrought iron, splinters of steel, and crumbles of composition of brass, or of babbit. To remove these obstructions is one of the duties of a filer, and the proper methods for this removal ought to be a part of every filer's education or a lesson in his instruction.

For cleaning a greasy finish file there is nothing better than a burning over the forge fire, in the flame of an alcohol lamp, or of a gas blaze. The burning should be done by a gentle passage to and fro through the flame, until the grease on the file burns with a blaze. Then the blaze should be blown out and the file be carded. When cleaned, dip the file into a jar of lye and clean in pure water.

For removal of clogged particles a chisel of flattened wire is as good as anything. This is used by hand, and its mechanical effect is simply to drive out the lodged particles by ploughing process.

For resharpening of file teeth acids have been employed, and to a certain and limited extent they are valuable. For this process the file must be chemically clean. This is insured by a soluble alkali, as lye, or an immersion in benzine, or naphtha, or spirits of turpentine, then a bath in clean warm water. The cleaned file may be placed point down in a jar of acid made up of half nitric acid, half sulphuric acid, and the combined amount of water—that is, as much water as the quantity of the two acids. The file, resting too down, may remain in this solution an hour or more, according to the depth of the teeth. But a much simpler method is to wash the cleaned file with the pickle at the foundry, and when it dries off wash it again, repeating the process several times, and finally washing off with clean water or with lye water and clear water.

It is doubtful, however, that this acid method ever really sharpens the teeth of the file. It cleans the file chemically, and allows it to do its work better than when the file is clogged and dirty. The only resharpening of files is of a mechanical character, and that is a contrivance that shoots sand and water or emery and water against the file teeth, at their back, with the force of a boiler pressure of steam from 60 pounds to 80 pounds per square inch. In this contrivance, which has been in successful use for many months in some of our large establishments, from a tank holding quartz, sand and water the mixture is drawn up through flexible tubes and directed simultaneously against the upper and lower surfaces of the file by the force of the steam. The steam acts in this case exactly as it acts when employed as an injector of water into boilers—the steam force lifts the diluted sand bath and directs it, with its boiler force, against the teeth of the file as the file is passed back and forth through the converging fires of the two tubes.

The result is a great improvement in the useful life of worn-out files.—*American Inventor.*

THE GAS ENGINE.—Prof. Ayerton has shown that the internally fired gas engine has a much higher efficiency than either a steam or hot air engine. At the same time, he makes the point that the gas engine using illuminating gas as fuel occupies the same position that, a few years since, was held by the electro-motor in which zinc was used in generating electricity. The Professor grows enthusiastic over the possibilities of a lower priced gas, and says: "If it shall be possible to manufacture a cheap heat-

giving gas, small gas engines driven with such gas will not only surpass in economy steam engines of the same size, but will produce energy at a cheaper rate per horse power than the largest steam engines ever made." This gas it is already more than "possible to manufacture." The non-illuminating water gas of the Lowe process is the very desideratum the English professor is looking for. He can find it right here. The question is not one of its coming, but how long will it take our manufacturers, architects, builders, and power users generally, to recognize and realize this coming?—*Water Gas Journal.*

STEEL WATER PIPES. The Chambray Co. makes pipes of steel plate for conveying water under high pressure. The steel plates are coated with lead on both sides by immersion or otherwise, then rolled to form, riveted, and soldered the whole length, and covered with pitch. The first cost of the steel is not much greater than that of iron, and the steel pipes possess considerable advantages over those of iron. The lead coating is superior on account of the fineness of grain in the steel; the resistance to tensile strain and internal pressure is 50 to 60 times, and the resistance to deformation longitudinally from 30 to 40 times greater, while the superior elasticity of the steel plate permits of the pipes receiving tolerably hard knocks without being permanently deformed. For equal thickness the steel tubes stand twice the internal pressure of the iron, and being both light and strong, they are admirably adapted for laying down temporarily and taking up again.—*Iron.*

THE CORROSION OF IRON AND STEEL.—At a recent meeting of the Paris Academy of Sciences, a paper was read describing some researches by M. Gruner, on the relative corrosion of cast iron, steel, and soft iron. Various plates, suspended in a frame by their four corners, were immersed simultaneously in water acidulated with 0.5% of sulphuric acid, or sea water, or were simply exposed in moist air of a terrace foundry. In moist air, chrome steels were corroded most rapidly, and tungsten steel less than carbon steel. Cast iron, even when high in manganese, is oxidized less than steel and soft iron, and white forge pig less than gray foundry iron. Sea water, on the other hand, attacks cast iron more than steel, and with special energy white iron. Tempered steel is less attacked than the same steel annealed; soft steel less than steel high in manganese or chrome steel, etc. Acidulated water, like sea water, dissolves gray pig iron more rapidly than steel, but not white iron; the gray, impure pig iron is most strongly attacked. These results agree with the complete experiments on the subject by Mallet, in 1843.

MONSTER STEAM WHISTLES.—A firm in Bridgeport, Conn., has recently completed a steam whistle for a Canadian saw mill, the bell of which is 20 inches in diameter, a quarter of an inch thick and 27 inches long, and is placed five inches from the cup which delivers the steam. The valve is of the ordinary spring pattern, and is four inches in diameter. The weight of whistle and valve is 406 pounds, and the cost of the monster is \$500. The mill for the protection of which it has been made, has been several times burnt down, and the object, therefore, of the whistle is to arouse the surrounding country in case of a recurrence of the catastrophe, and also to carry signals to wood-choppers in the neighboring forests. There is another big whistle at New Brunswick, in New Jersey, with a deep bass hum which serves as the clock regulator for farmers and others within a radius of 20 miles of the town. There is also a whistle at Sandy Hook 15 inches in diameter, while many of the ocean and sound steamers have whistles from 8 inches to 10 inches, which can be heard from 10 to 20 miles.

A NEW COPPER-ZINC ALLOY.—*Engineering* says that Mr. Alexander Dick has succeeded in producing a new copper-zinc alloy which exhibits characteristics as essentially superior to brass as those of bronze are to gun metal. The advantages claimed for the new alloy, which has been named "delta metal," are great strength and toughness, and a capacity for being rolled, forged, and drawn. It can be made as hard as mild steel, and when melted is very liquid, producing sound castings of close fine grain. The color can be varied from that of yellow brass to rich gun metal; the surface takes a fine polish, and when exposed to the air tarnishes less than brass. The latter characteristics will meet with ready appreciation for cabinet work, harness fitting, etc. The metal when cast in sand has a breaking strain of 21 to 22 tons per square inch; when rolled or forged hot into rods, the breaking strain is 43 tons per square inch; and when drawn into wire of 22 B. W. G., of 67 tons per square inch.

TO PROTECT IRON AND STEEL FROM RUST.—Prof F. Grace Calvert, of England, has discovered that the carbonates of potash and soda possess the same property of protecting iron and steel from rust as do those alkalies in a caustic state. If an iron blade is half immersed in a solution of either of the above carbonates, it exerts so protective an action that that portion of the iron which is exposed to the influence of the damp atmospheric air does not oxidize, even after a period of two years. Similar results have been obtained with sea water to which have been added the carbonates of potash or soda. The applications of this fact are numerous and important.

SCIENTIFIC PROGRESS.

The Movement of Water in Plants.

The *American Journal of Science* gives some interesting particulars in regard to some recent observations by N. Julien Vesque in regard to the movement of water in plants. That gentleman has devised a very simple method of demonstrating the transfer of water in the stems of plants, which promises to have a wide application. The stem is cut obliquely during immersion in water, and the thin part of the severed stem is placed in the field of the microscope, of coarse completely wet on the cut surface. After the cover-glass is adjusted and the stem is securely fastened, so that it cannot be easily disturbed by subsequent treatment, a very little freshly precipitated calcium oxalate or other finely divided substance, is introduced under the cover. If the leaves have not been removed from the stem, a rapid current is at once observed to flow towards the cut surface. The insoluble salt collects at the open mouths of the vessels, often passing into the capillary tubes after a temporary arrest, and the same phenomenon is repeated several times as the minute plugs are formed and then sucked in.

With low powers of the microscope it is possible to use a second slip, instead of the thin cover, and then the simple apparatus can be held more firmly in its place. In any case it is possible to measure the rapidity of the current by means of a micrometric eye-piece; and several such rates are given.

When the stem is quickly stripped of its leaves the current is stopped at once. But when, on the other hand, a leaf or a part of the stem is pinched, there is immediately a backward flow of water.

It is well known that two conflicting views have been held by physiologists as to the channel by which the upward movement in wood takes place. Some think that the transfer is solely by imbibition, and that no free water is carried from cavity to cavity of the wood element, or rather, that no free water exists in the cavities. Others have held that free water was carried from one wood element to another, and that the walls themselves play only a subordinate role. To these opposed views may be added a third, which appears to be a compromise; namely, that water in a free state actually exists as a thin lining on the cell wall. The chief advocate of the latter view has, however, abandoned it in favor of the imbibition theory. A recent publication by Eifving details the results of experiments which considerably strengthen the "cavity" theory. Now just at this point come observations of Vesque, in a continuation of the paper regarding the method of direct demonstration, which go far towards showing that here, as was long ago suspected, the truth is to be found between the extremes. These experiments, which need to be carefully repeated, indicate that under certain circumstances the transfer of water takes place by means of the cavities themselves, but that in all cases they may serve the part of reservoirs.

Moreover, the caliber and length of the vessels regulate the rate of transpiration; resistance to the movement of the water following the law of Poiseuille, so that the resistance is inversely proportional to the fourth power of the diameter, and directly proportional to their length. Climbing plants have larger vessels than low-growing plants. The quantity of water which can pass through a vessel in a given time bears a certain relation, varying for each species with the water which it contains. M. Vesque expressed the opinion that the study of the anatomy of plants will open the way to a more national culture than any which now prevails.

Underground Temperature.

The British Association committee on underground temperature, in their last report, adopted 64 feet per degree rise in temperature, or 0.01566 of a degree per foot depth. To obtain an approximation to the rate at which heat escapes annually from the earth, they reduce the above rate of increase, .01566, to Centigrade degrees per centimeter of depth. For this purpose, we must multiply by .0182, giving .000285. To calculate the rate of escape of heat, this must be multiplied by the conductivity. Prof. Herschel, in conjunction with a committee of the British Association, has made a very extensive and valuable series of direct measurements of the conductivities of a great variety of rocks, and has given additional certainty to his results by selecting as two of the subjects of his experiments the Calton Hill Trap and Craigleith sandstone, to which Sir William Thompson's determinations apply. From combining Prof. Herschel's determinations with those of Sir William Thompson, .0058 is adopted as the mean conductivity of the outer crust of the earth, which, being multiplied by the mean rate of increase, .000285, gives the flow of heat in a second across a square centimeter. Multiplying by the number of seconds in a year, which is approximately 31½ millions, we have 1,633x31½x10¹¹=41.4. This, then, is the British Association committee's estimate of the average number of gramme degrees of heat that escapes annually through each square centimeter of a horizontal section of the earth's substance.—*Van Nostrand's Engineering.*

The Red Spot on Jupiter.

At the first regular meeting of the American Astronomical Society, held March 3d, the topic for discussion was the "Physical Changes in Jupiter." A paper on the "Red Spot on Jupiter" was expected from Mr. S. V. White, the President of the society, and there was considerable disappointment over his inability to be present.

The remarks of the members were confined to the recent changes in Jupiter. Messrs. Parkhurst and Serviss described their observations of the great red spot which made its appearance on Jupiter's disk in the summer of 1878, and which within a few weeks has almost entirely disappeared. Others took part in the discussion.

The general opinion expressed was that Jupiter is a world which is yet in a very early stage of its geological history, and that in the great red spot, and in some other remarkable spots which have made their appearance upon its surface, evidences are seen that the planet either has already a solid or liquid surface, or that the formation of such a surface has begun. Several theories to account for the great red spot, which was upward of 30,000 miles long by 6,000 or 8,000 miles wide, were suggested.

One theory was that some volcanic action may have been taken place, which threw up into the atmosphere a mass of smoke and erupted materials which formed the red spot. Another theory was that the crust of the planet where the spot appeared may have been exceptionally heated, so that the atmosphere above it was kept free from clouds. A third theory regarded the red spot as possibly a solidified mass thrust up through its gaseous and liquid surroundings, and forming, perhaps, the nucleus of one of the future continents of the giant planet. The difference between rate of rotation of the red spot and the white spot in the southern belt was referred to. The red spot overtakes the white spot once in 34 days.—*Scientific American.*

USE OF THE MICROSCOPE IN BREWING.—Not only is an impoverished yeast unable to develop an active and healthy fermentation, but being itself so weak it is less able to battle against the different disease ferments, which always become more active as the yeast itself loses its vitality. The persistent use of the microscope is, says the *Brewer's Guardian*, the only means by which the necessity for a change of yeast can be recognized, and, therefore, the yeast from each brewing ought to be examined from day to day; as soon as the cells are observed to lose their rotundity, to elongate and to acquire something of the shape of the figure eight, as it is a sure sign that some deterioration is taking place, and when the cells become filled with granular matter it is certainly time to make a change, for the yeast must then be seriously weakened. Simultaneous with these alterations in the appearance of the yeast cells the careful observer will be sure to find that numerous other organisms, such as bacteria, lactic and other diseased ferments, begin to make their appearance, and if the use of such a yeast is persisted in, the resulting beers cannot long remain sound and with a proper and normal flavor. Frequent and unnecessary changes of yeast are to be deprecated, but it is far more serious to continue to use a yeast when once degeneration and deterioration have set in.

THE EFFECTS OF OIL UPON WAVES.—In reply to an objection of Admiral Bourgeois that the actual effect of oil upon waves should be fully tested before it is submitted to theoretical analysis, M. G. Vander Mensbrugge replies, that he has shown from incontestable facts that the wind produces upon the superficial layer of the sea, a horizontal motion of translation, which being sufficiently prolonged can communicate to the deeper layers, and can propagate to a great distance, very decided undulations. He has confined himself to a discussion of two cases; in the first, where the calm sea is covered with a thin layer of oil and is then submitted to the action of the wind; in the second, where the waves break. In the first case the formation of great waves is rendered impossible by the presence of the layer of oil. In the second, a simple calculation shows that the layer of oil exerts a great resistance at the base of the breaker, and thus compels it to extend itself and to subside very rapidly without producing severe wave shocks.—*Comptes Rendus.*

WATER TO BE CARRIED AS GAS.—M. Pasteur, a nephew of the celebrated chemist of that name, has recently adapted an old discovery to great practical use. It is a well-known fact that the crossing of the great African desert is accomplished by means of caravans composed of camels, horses, etc., the water for which has to be transported on the back of the consumer. This lessens to a great degree their freight capacity. M. Pasteur has established suitable works at the numerous termini of the routes for separating the water into oxygen and hydrogen. As the latter is 16 times lighter than the former, and is the gas used in balloons, it carries the oxygen and a considerable part of the camel, besides furnishing light on dark nights. He unites the gases by the simple means of explosion when desired for use. The French Government has created M. Pasteur a Commander of the Legion of Honor for his great adaptation.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

HOOSIER MINE.—The mine is located on the rugged country on the Calaveras river about three miles above Jesus Maria. A ten-stamp mill has been erected with useful appliances, including feeders and rock-breakers. But ten stamps have been put up for the present but the frame work was constructed so as to permit the addition of ten stamps more. The mill is run by a hurdy-gurdy water wheel, the necessary pressure being easily obtained by a ditch tapping the Calaveras river a comparatively short distance above, and supplying free water for running and all other mill purposes. The claim comprises three locations, the Mary Lory, the Way Ground and the Hoosier, all of which is included in the Hoosier Consolidated. Notwithstanding the nearest point from which ore has been taken is several hundred feet up the steep mountain side from the mill, the admirable arrangement for economic prospecting purposes permits comparatively easy conveyance of the ore to the mill. Four tunnels have been run at intervals along the course of the lead besides prospecting shafts, in all of which was found good rock and the indications of the existence of a true fissure vein. A tramway 113 rods in length with a grade of one foot to the rod was constructed, reaching from the Hoosier tunnel to a point above the mill, with which it is connected by another tramway 300 ft in length directly down the hillside where the steeper slopes at an angle of about 45°. By means of a wire cable working upon pulleys at the upper end of the track two cars are run upon it, the descending loaded car drawing up the empty one, and by a contrivance called a "cradle," at the entrance to the mill, the car is made to dump itself, the car remaining on the upper tramway regulating the speed of the descending car by means of an effective brake. By the time the loaded car has reached the mill, the ascending car is in place ready to be filled. The first run of 75 tons of the ore from the old dumps exceeded the estimate made, and yielded 37 per cent. The indications are that the present run will equal if not exceed that figure, and as the cost of milling the

SOUTHERN UTAH is reported as having but little snow in the mountains, while the valleys are very dry.

rock, as we are informed by Mr. Mayon, does not exceed \$2.50 per ton, it is plain the investment is not a bad one.

EL DORADO.

GREENWOOD.—*Georgetown Gazette*, March 24: At Zentgraf's we see the new stamp quartz mill, a plain free gold one, with a 30 feet diameter overshot water wheel, the water supplied from the Cal. W. & M. Co.'s ditch, being conveyed by flume across the road from a safe and compact reservoir placed at a sufficient height to be available in case of fire in the mill; everything around is in perfect order and betokens prosperity. Mr. Zentgraf's son and nephew run the mill on alternate shifts, night and day. We visited the mine where we found the miners stopping, the ledge varying from two to seven feet in thickness, all good looking ore. Mr. Zentgraf, whose cheerful smiles, as he proudly shows you his express receipts for bullion, convinces you that he is satisfied with his investment, and, indeed, he should be, for he says that since the mill started to run he has tried ore from various parts of his large mine, and always with satisfactory results. No rich pockets—no splendid specimens; but good mill ore of a grade sufficient for profitable working. This summer Mr. Zentgraf proposes to add another battery to the mill, run a tunnel from the mill to the ledge, from which he will be able to dump his quartz on the floor in the feeding room, at a saving of a dollar a ton over the present method of hauling and dumping, and continue sinking the main shaft from which to open and fully develop the mine. Mr. Zentgraf carefully and thoroughly prospected this mine till he felt justified in placing thereon the present mill, the results from which fully warrant his increasing his power of reducing ore, and he will further pay attention to the saving and working of the sulphurets which will certainly increase in quantity as greater depth is attained.

MR. PARKHURST, who was down from Volcano-ville, Wednesday, informs us that R. G. Hart expects to start up his 10-stamp mill on the Josephine mine on Friday of this week. Mr. Hart was one of the most thorough quartz mine operators of Nevada county, and that is saying a good deal, for Nevada county has a world-wide reputation for milling quartz. Mr. Hart has displayed much energy in developing and placing this mine in good working condition. Everything about the mine and works is constructed with a view to permanency. The ledge has been thoroughly opened up on the second and third levels, by tunnels run in on the ledge from the mountain side. It is below the mouth of this lower tunnel where the new works are built. The mill will be run by water power. Parties who have recently visited the mine are much elated with the richness and magnitude of the ore, declaring that it is the best mine in the county, and that the new works are a model of perfection. Mr. Hart is one of those cautious, practical mining men who operates a mine on its true merits. Such men are an honor to the State. They lift up our mining resources, by careful and intelligent investments, while schemers and swindlers speculate off our eastern brethren by handling mines which a man like Hart would not be guilty of recommending to any one. Such proceedings have been carried on in this county, and our mining interests have received a terrible back-set in consequence.

CONTRACT LET.—Last Saturday J. E. Lyon let a contract for a 200 foot extension of the Lyon tunnel, through the Mount Hope to the Flagstaff mine. This tunnel will tap the ledge in the Flagstaff at a depth of 200 feet, which will be worked through the tunnel.

GOOD NEWS.—Supt. W. A. Jones, of the Placer-ville Gold Quartz mine, returned from San Francisco last Tuesday, after an absence of two or three weeks, and assures us that the P. G. Q. will start up again within a few days, certainly within ten days, and that operations will be steadily prosecuted on the accustomed scale. This will be hailed as good news in mining circles.

THE RIP VAN WINKLE.—This mine, owned by A. A. Gignae and M. McGonagle, is located about 400 feet west of the Mount Hope mine, of which J. E. Lyon is Superintendent. After running a tunnel into the Rip Van Winkle 130 feet they struck a two inch seam of rich quartz, which, after following it 10 feet, has widened to 12 inches of ore that averages from \$15 to \$20 per ton.

MONO.

MAY LUNY MINE.—*Bodie Free Press*, March 24: K. T. Pierce, of Sundy, who has been below during the winter, is again among us. Work in the May Luny mine will be resumed at once, with about the same force as last year. The erection of a new mill will not be commenced at present.

MARIPOSA.

UNION.—*Cor. Mariposa Gazette*, March 24: While here, I took a short run over to Sweetwater, where I found my old friend Rice in the face of his tunnel, on the Union mine, which, now is in about 160 ft., with very favorable indications of striking the vein in the near future. The croppings certainly show some fine specimens of rich ore. Should this ore continue to the tunnel level, the Union will assuredly prove a rich and valuable mine. Adjoining the Union is the Mountain-view, which, also has flattering prospect. While here, I went over to the old Harbert mine now owned by Messrs. Grove and Ellingham, who have done considerable prospecting since the property came into their hands. The main shaft has attained a depth of 90 ft., with a good vein of good mill ore running the whole distance. At this point they encountered water, which necessitated the erection of hoisting and pumping machinery, which is now in course of erection and will be in running order, in 15 or 25 days. We returned to the Mountain-view House. Leaving this place on the following morning, we cantered to Snow creek, thence to the old Buckingham mine, now called the Vanderbilt. Recent developments have shown that this mine is destined to be one of the great bullion producers of this coast. Its vein crops out very prominently for a distance of a mile in length, with a width of 25 ft. They are now driving on the vein from the south end of the mine, and are in 30 ft., showing a regular, well defined vein the whole distance, of an average width of 8 ft., showing free gold and sulphurets of a high grade. Average samples taken from this point show an assay value of \$15 per ton, in gold and silver, and the concentrations, \$900.

PLACER.

THE GOLD BLOSSOM.—*Placer Herald*, March 24: At the Gold Blossom quartz mine, a short distance below Ophir, the mill is running steadily, and everything is turning out to the entire satisfaction of those interested. This mine was purchased last fall, and the new owners have put up new hoisting works, a fine new mill with all the modern appliances for saving gold, a large patent furnace for roasting the sulphureted ores, and other appurtenances essential to the thorough equipment of a mine. The clean-up for February was highly satisfactory, and the present run bids fair to be even better. They are down now about 200 feet at which depth the size of the ledge is undiminished, and the ore shows no deterioration in quality. The success of this enterprise will have a good result in increasing confidence in the district and promoting the development of our numerous quartz leads.

A MAMMOTH LEDGE.—Wm. Werry, one of Placer's enterprising mining men, claims now to have not only the "biggest thing on ice," not only the biggest thing in Placer county, but the biggest thing in the way of a mine in California. It is a quartz lode, located on the side of the American River Hill, about four miles south of Colfax. It is a well defined fissure vein, at least 50 feet thick, and numerous prospects from different parts of the ledge show the rock to average from \$6 to \$12 per ton. A mill test of 180 pounds yielded \$1.12.

SAN BERNARDINO.

CALICO MINING NOTES.—*Calico Print*, March 24: Work is still progressing in the new shaft in the Geneva. They are taking out some good ore; 150 sacks have been taken to the Pioneer mill at Hawley's station. Work is progressing on the Tiger, Great Eastern and Rocky Point, owned by Dr. Turpin and others. Ore is being taken out daily from the Sue, Humbug, Kearsarge, Thunder, and a large quantity was brought from each of them the other day by S. P. Holden, of San Francisco. It is reported that the Pioneer mill, recently purchased by the Silver Odessa Company, is soon to be enlarged to a 10-stamp mill. It is busily at work on good ore. It is reported that a rich strike has been made about a mile west of the Total Wreck. The other day 30 sacks of first-class ore was shipped from the Little V to S. P. Holden, ore buyer, of San Francisco. This mine is now owned by Wm. Raymond, J. H. Kane and T. H. Eccles. It is a beautiful little mine and exceedingly rich. The invincible sent 25 sacks of fine ore to S. P. Holden the other day. The Comet, situated between the Little V and the Invincible is now being worked by Tom McFarlan, and the rock taken out looks well. Two men are chloriding on the Veto with good results. The average assays of the Thunder is \$390.

TOTAL WRECK.—The owners of this claim are energetically at work developing it, and they feel highly elated over the results of their labors. The last reports from this claim were decidedly flattering. The ledge, which at first appeared to be small, has proven to be of considerable size. Sixteen feet from the surface it shows splendid walls, and is getting wider and more solid as they go down. They are now sinking a shaft instead of an incline. The character of the ore improves as they descend. The ledge was examined by Mr. Maddox, a mineralogist and mining expert, and pronounced to be a good one. The returns of some specimens, which were sent to Los Angeles, shows that it goes well up in gold. The assayer said that the ore came from a natural formation. They are making room for a windlass, and will commence to sack ore soon.

SHASTA.

WHISKYTOWN.—*Shasta Courier*, March 24: The Mad Ox mine owners will soon have on the ground machinery for a steam mill of good capacity. When in operation they expect to crush 500 tons of quartz a month. They have recently added several to their force of workmen and I understand purpose to put on about 20 more. On Mad Mule they are working a force of half a dozen, cutting through to strike a seam. We drop a tear over gulch miners and arastars until it rains.

TRINITY.

QUARTZ EXCITEMENT.—*Trinity Journal*, March 24: Some very rich specimens of quartz were brought to town this week by Mr. Chris. Meckel, of North Fork, from a ledge recently located by John Day, Jas. Moore and Will Day on the head of the East Fork, about seven miles above the town of North Fork. From a piece of this rock, weighing four and one half ounces, 18 cents in gold was taken by simply crushing it in a mortar and panning out. This is at the rate of \$1,280 per ton, and the specimen was not regarded as more than a fair sample. The lode has been traced a distance of 3,000 feet, running nearly east and west; it lies flat, or horizontal, and is from one and a half to two feet thick. How far it may extend into the hill is not known, but if what is in sight averages anything like that sent to town the boys have an immense thing in that alone. This find has already stimulated some to prospecting and several parties have already set out. The whole country in the neighborhood of this discovery is covered with quartz, and lodes of all sizes are plenty. The gulches thereabouts paid largely in early days in quartz gold, and every indication points to the probability of numerous valuable discoveries.

NEW RIVER QUARTZ.—Assessor Marshall returned to town, Wednesday, after a couple of weeks official trip to Lower Trinity and New River. He tells us that placer mining is generally dull, owing to the dry season, but that on New River some good quartz prospects have been found and that the work of developing ledges will be prosecuted with vigor and every prospect of success the coming summer.

Nevada.

WASHOE DISTRICT.

UNION CON.—*Enterprise*, March 24: Good progress is making in the joint Sierra Nevada east crosscut on the 2900 level, but during the week there has been no change of material worthy of note.

OPHIR.—The usual repairs are being made, and ore is again being extracted from the croppings.

GOULD & CURRY.—The west crosscut is being advanced toward the west wall in vein material of a promising appearance. The crosscut is now out almost 700 feet. The diamond drill was put into the face this week, and showed considerable very hot water ahead.

YELLOW JACKET.—The yield of ore from the old levels at the Winters' shaft has been increased to 75

tons per day. A good deal of prospecting is being done at several points.

SIERRA NEVADA.—Good headway is being made in the joint Union Con. east crosscut on the 2900 level. The face is in vein material which exhibits no features worthy of special note.

CON. VIRGINIA. The southeast drift on the 2500 level making very fair progress. It is very hard at the face, but there is no increase of water.

SAVAGE.—The joint Hale & Norcross north lateral drift on the 2600 level is being rapidly advanced, and is cutting frequent feeders of metal-bearing quartz.

MEXICAN. The joint Union Con. east crosscut is in vein material, showing occasional seams of quartz.

HALE & NORCROSS.—The north drift on the 2600 level, joint with the Savage, is passing through vein material that shows frequent feeders and bunches of quartz that give promising assays.

COLUMBUS DISTRICT.

NORTHERN HILL.—*Candelaria True Fissure*, March 24: The east drift from the bottom of the main winze, from the fifth shaft level, has been extended 12 feet during the week. Its total length is 34 feet. A bunch of fine sulphurets was developed in crosscut No. 2, on the same level, in the early part of the week, but did not prove as extensive as anticipated, the face of the crosscut having passed entirely through and out of it. The fourth shaft level is producing as usual, the ore continuing of good quality. There is an improvement on the second intermediate shaft level, both in the length and width of the ore in the stope. Mill No. 1 was started on Mount Diablo ore, on Monday morning, and it is working on half time. The bullion shipments amounted to \$15,204.71 for the week ending March 22, and aggregates \$39,332.05 on March account to the same date.

MOUNT DIABLO.—The stope from the raise, nearly north of the shaft on the second level, is yielding considerable 70 ore. The west stope from the Calison winze shows 18 inches of 50 ore. A small amount of 75 ore is being extracted near the shaft on the first level.

Arizona.

MOHAVE COUNTY NOTES.—*Alta Arizona*, March 24: Dr. Brown is pumping the water out of the Keystone mine, and will start work on that splendid property at an early day. O. Groom has been sinking on the Illinois mine, at Chloride. He has about 12 inches of fine looking sulphure ore in the bottom of the shaft. The drift which Welton & Grounds have been running on the Juno, is in 70 feet, and there is a nice streak of galena ore in the face. It carries over \$400 in silver and gold. Henry Ewing and Robert Meara have been sinking on the Tuckahoe mine, at Chloride. They have from six to eight inches of sulphure ore, that carries ruby and silver glance. W. H. Bennett, well known in Colorado, New Mexico and Arizona, has recently come into possession of some fine prospects in this mining district. Isaac Conkey and William Raywood are taking out some fine sulphure and horn silver ore from the Mountain Grove. E. C. Sherman will start to work with them next week. We were shown some ore from there that is very rich. They are going to run a tunnel in on the ledge, and go to taking out ore. H. B. Cox & Co., and W. H. Davis, have located in Music Mountain, near the Silent mine, what is called the Fairview mine. We have seen quite a number of samples taken from this new find, all of which had an abundance of free gold, visible to the naked eye. The Fairview is a ledge 3½ feet thick, and free gold has been found in the croppings for a distance of over 1,000 feet. It assays \$85.27 in gold, and \$9.43 in silver.

BRADSHAW MOUNTAINS.—In a recent conversation with N. C. Sheekles, of Bradshaw mountains, we learned the following: Brittingham, Hayden & Bond, owners of the old Jinks claim, on the Lorena mine, are putting up a whim. They have about \$30,000 worth of ore on the dump and a great deal more in the mine. Their ore is certain to pay \$100 per ton. E. S. Junior has several fine claims in Bradshaw mountain, the best of which is thought to be his Cougar claim; out of it he has taken very rich rock. The mine is large. Mr. Campbell keeps on running his antrax on ore, from the Ore Bonita mine. In Bradshaw Basin, O. F. Place is developing the Buckeye and other mines. Mr. Sheekles tells us that Mr. Place's prospects are very good. He is a good mine manager. John Lake has driven a tunnel 200 ft on one of his ledges. South of the Bradshaws, in the Silver mountain country, prospectors recently struck a large vein which is said to be very rich. The Belle mine, in Big Bug district, must be a "masher," judging by the way in which it impresses miners, who describe it as being the most perfect specimen of a true fissure vein ever seen by them. Ore from it is all the time being taken to the Howell smelting works, some three miles distant, on Lynx creek.

SMELTERS.—Thinking miners now believe that smelting furnaces will solve the mining problem in our section. Most of our ores submit to the process very readily and it is about the only rational process to apply to them. This being the case, we hail with pleasure the era of smelters; which are now coming in. In fact Howell & Co., have already ordered two more smelters for their Lynx creek works.

PLACERS.—The winter just passed has not been a good one for placer miners. The clouds gave us but little snow, water has been scarce and but little placer gold has been taken out. Some of our readers may not regard this as much of a drawback, believing as they do, that the placer mines of this section are about "played." We beg leave to differ with them. The placer diggings of this section are, as yet, almost untouched. True, creek bars and beds, ravines, etc., have been more or less rifled of gold; but the heavy gravel beds still remain, and in winters such as we have had, when the country was soaked with water, they could be worked with great profit. We no longer expect to pick up pieces of gold from bare bed rock. The time for that pleasant and profitable occupation has gone by, but we do expect to get good pay out of the gravel deposits. There are miners who believe that the Senator mine, Hassayampa district, should not much longer be allowed to remain idle. Its ores could be packed at little cost, to the Howell smelting works. When milled the ore paid, and tailings from the mill also paid, for slow and expensive treatment.

MINERS.—Not capitalists—are opening some ledges in Groom creek district, which, they say, promises well.

New Mexico.

TRINIS.—*Southwest Sentinel*, March 21: John Kirk and three Mexicans are panning gold with an ordinary rocker, in a gulch south of Pinos Altos, at a profit, it is said, of \$20 to \$40 per day.

SAN PEDRO C. M. Co. have shipped their first car load of refined copper. All the shipments heretofore were in the shape of matte.

CAPT. PENROSE has made a strike of silver discovering several hundred ounces to the ton on the surface, about five miles north of the city in the Pinos Altos district.

Montana.

THE MOULTON.—*Inter-Mountain*, March 22: Mr. Pat Clark, Superintendent of the Moulton, was on the street this morning, feeling particularly good over the recent strike on that property. The new ore body was discovered on the south vein, at a point about midway between the end lines of the claim and 380 feet west of the main shaft. The shaft is now 200 feet deep, and the vein is from four to six feet wide, most of it pay ore. Ten tons of ore, which mills about \$700 a ton, are being extracted daily. The strike is increasing in width and the bottom of the shaft is now all in ore. In the main workings operations are progressing as usual and the production of 40 tons of ore per diem is regularly maintained.

STRIKE IN A PROSPECT.—The Butcher brothers have made a rich strike in a prospect known as the Bonanza, located southwest of the city. They started a new shaft a few days ago, and now, at a depth of 10 feet, have a handsome vein of ore two feet wide, assaying high into the hundreds.

SUCCESSFUL RUN ON ANACONDA ORE.—Although the Anaconda is one of the greatest copper mines on the continent, it is also a steady producer of silver ore, and for the past eight months has regularly supplied the 15-stamp Dexter mill with free-milling ore. The supply is taken principally from the 100 and 200 levels, below which the ore carries an increasing percentage of copper until on the fourth, fifth and sixth levels the ore is almost exclusively copper bearing for the full width of the immense ledge. The Dexter mill was thoroughly refitted last fall, and under the supervision of Mr. Julian Smith, has been running continuously ever since. The amount of ore worked daily is about 27 tons, which is crushed wet, and a force of 19 men is employed to run the mill. The assay value of the ore, which is free, averages about \$30, though above the copper levels there are thousands of tons of high-grade silver-copper ore, which is rich enough to ship, and which cannot be worked by the free-milling process.

Utah.

STAR DISTRICT.—*Cor. Salt Lake Tribune*, March 24: A fine body of ore has been struck in the Kanarrab mine in South Camp, at a depth of 250 ft. The ore body is large and continuous. It will assay about 50 ounces silver, and 45% lead per ton. Work still continues on the Mammoth and St. Mary mines with good results, in fact, all the mining claims that have been worked upon the past winter are looking better than ever before, and greater depth is attained, which proves that the ore bodies lay deep. Some of the claims have reached a depth of 300 ft with ore in the bottom. This district is not troubled with water, as the mines so far are dry and are likely to remain so for 1,000 ft at least. At North Camp, work has been started upon the Osceola, and some nice ore is being taken out. Also on the Dykes and Morehouse mines. The Lake Superior mine, now being worked by J. H. Lighthall and Forgie Brothers, is looking splendid, and a large body of copper ore, containing gold and silver, is being opened up.

BRADSHAW DISTRICT.—The Cave mine has stopped the shipment of ores to Frisco. Rumor has it the company contemplate the reduction of their own ore at Milford, which is 16 miles nearer the mine, at an early date. There will be money made if they do. The Horn Silver Works should have been built at Milford or some point in the valley, as the situation and facilities are here for them. Work in the Horn Silver is resumed again. The cave was expected and prepared for some time ago, but they did not expect it to go so deep as it is now. It will be all the safer to work in the future. By the cave they have saved great expense in timbering, and it was most all ore that came down. The O. K. copper mine in Beaver Lake district, is looking well and a whim is being constructed.

LINCOLN DISTRICT.—This camp is looking up again. The Frisco M. & S. Co. have become interested in it of late. Work still progresses on the Lone Brother and other claims, with favorable results.

Oregon.

NOTES.—Placer mining never was as complete a failure as this season. Considerable prospecting is going on in Jackson and Josephine counties. R. Cook of Steamboat was in town this week. His tunnel is over 250 ft. in length. A mining firm, composed of a colored man and a half-breed Chinaman found a nugget of gold, weighing nearly an ounce, on Jackson creek, a few days ago. A quantity of quartz from the Barkdel ledge in Blackwell district has been sent to Col. Wallace at Portland for assay. Several residents of this county are interested in the ledge. C. W. Kahler has made application for a patent to some ground in Big Applegate mining district. Lagg & McDonnell has also applied for a patent to ground in Jackson district. C. W. Barkdel of Blackwell, who was in town Tuesday, informed us that Welch & Co. have a force of eight men at work on the old Blackwell ledge, which they propose to thoroughly prospect. Wm. Griffin, who has a quartz ledge in Galice creek district, has sunk down on it to a depth of 30 ft., and is so well pleased with the prospects that he proposes investing in a Salmon quartz mill. He has about 100 tons of ore on the dump. Geo. Simmons, James Hansen and others are about inaugurating an enterprise that promises to be one of the most extensive ever attempted in Oregon. They propose bringing the waters of Illinois river to Mr. Simmons' ranch and upon very deep banks of gravel, which will require one or two tunnels and an immense ditch. Although it will take a large amount of capital to accomplish this, that ample remuneration is in store for them seems to be assured. The ground will be thoroughly prospected soon.

Official Villainy.

However much we may cheer our hearts and fortify our convictions with the amiable optimism, that everything in nature is ordered for the best, and that in the struggle of life the fittest wins, and that the fittest is always the best and ought to win, we must still confess that our public morality is shamefully low. Compared with what man once was, it may be tolerated, but with what his condition is, in the light of our present civilization, it is simply disgraceful. The fact that there is one eastern city that owes a debt of \$120,000,000, of which it is safe to say that at least one half has been stolen by its municipal officers, may be regarded as a specimen page from a large history. Over our national politics, Congressional and State legislation, over public contracts, the handling of public funds, and all fiduciary interests, there hangs a dark cloud of suspicion. So prevalent has official villainy become, that some one made the remark the other day, "If you see a man running across a field, arrest him on the spot, for the chances are that he is a defaulter, or has stolen something."

And this malfaisance and corruption in office is not traceable to the domination of any set of political ideas; for human nature is all cut off the same piece, all blood comes from one puddle, and the average man, whatever may be his political affiliations, will, under the same pressure of circumstances, do the same thing.

One painful fact, explanatory of this state of things, is the almost universal apathy of the masses to the moral character of their public functionaries; indeed, it has passed into a sort of sneaking proverb, that men under congressional or legislative formalities, in caucuses, handling the ropes of an election or dispensing public patronage, may do for themselves, their friends, their party, what, in common business relations and social interchanges, would be denounced as indecent and dishonorable. And what is the consequence? Whisky rings, port trader frauds, star route thieves; all sorts of thieves, torts and laches in office.

The people of Tennessee deliberately vote to reduce their taxes by repudiating the State debt. Is it strange their State Treasurer was tempted to steal the public funds? It has become a recognized rule, among all successful aspirants for office, that the political hacks, the whippers-in, the blowers and strikers must have their reward. Is it strange we so frequently hear of mismanagement and defalcation? It is the way such plausible villains as Moro P. Kay and John S. Gray usually get into official positions. We can expect to see an improvement in political morality only so far as the mass of the people rise above all party feeling, all traditional prejudice, all local and selfish interests, and shake themselves free of all cliques, rings and drill clubs, and join in a generous rivalry to see which side or party can excel in nominating the best men for office, men with the finest brain and culture, and well-known substantial habits of honor and integrity.

Another cause of this laxity in political morality comes from the neglect of courts and juries to rigidly apply the law, and the too great leniency of executives in exercising the pardoning power, especially if the criminal has great political or social influence. The State cannot wait for religion or culture to make men good and honest, for the beautiful results of religion and culture ripen slowly, and the State has no time to lose. Rome did not wait for Cataline to get religion. She banished him. Washington did not wait for England to learn justice toward the colonies. He gave battle at every sunrise. Lincoln did not wait for the evolving forces to soften the heart of the slave master. He issued his proclamation. Law is the first great support of the land, and, possessing the intelligence to enact good laws, we lack the moral stamina to sternly and impartially enforce them. Law is the schoolmaster to train the people toward civilization. Had New York punished rigorously the little beginnings of fraud fifty years ago, it would have been a fiery ennoblement over the doorway to office, warning every man who would enter, that the way of the transgressor is hard.

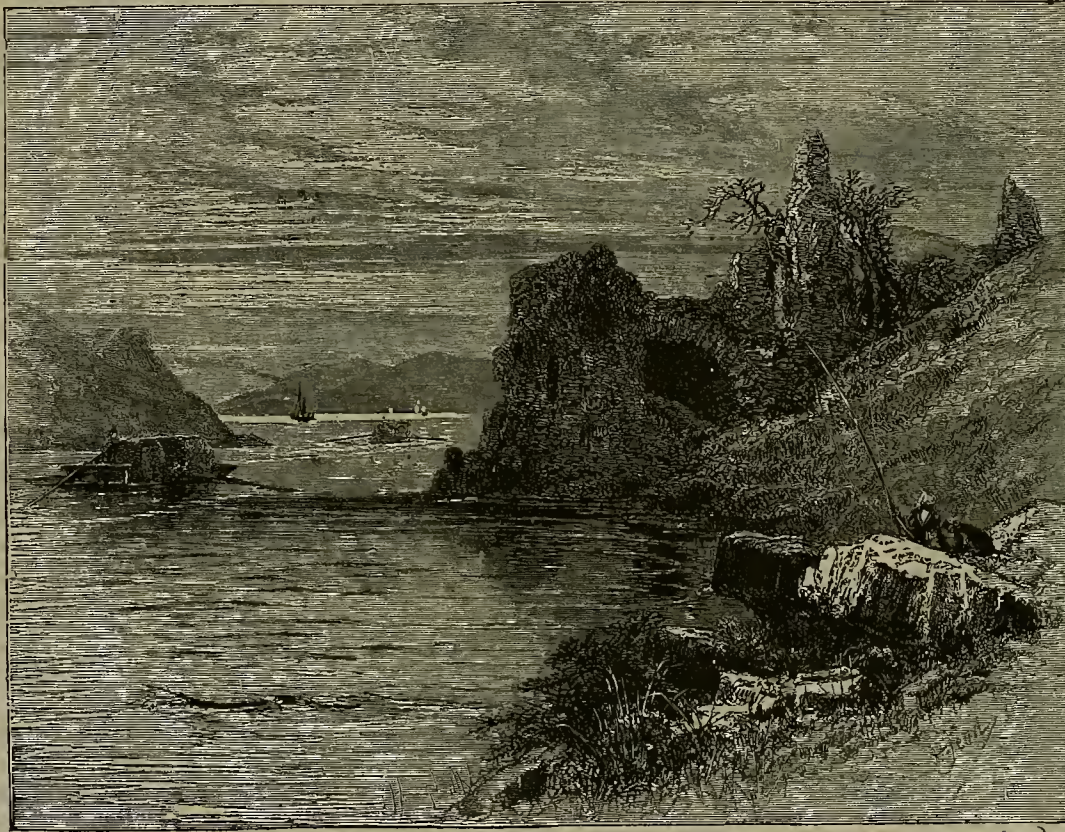
Such men as Tweed, Hall, Duncan and Dorsey, and the host of wire-pullers, time-servers and political hucksters, who have their consciences for sale, know nothing of right as an abstract principle, as a law of duty whose throne is the bosom of Deity. The statute book is the only guide they recognize, and when it is inadequate or not likely to be enforced, then

the school master is asleep, the schoolhouse is closed, and lawlessness and crime have the State for a play-ground. Shakespeare says: "We must not make a scarecrow of the law, setting it up to fear the birds of prey, and letting it keep one shape, till custom makes it their perch and not their terror."

And what is our Penal Code, in many criminal courts, but a scarecrow that may frighten the poor and timid, but only excites the scorn and contempt of the bold and daring. The chances of escape for wealthy or influential criminals, through the delays of the law, defective pleadings, the conflict of authorities, tortuous construction, the technicalities of evidence, spiriting away or suborning of witnesses, and packing juries, have become so great that the punishment of Tweed stands out in forensic history as a solitary monument. And when such absconding defaulters as Gray are caught and convicted they are rarely ever punished in such a way as to make crime odious, and deter others from committing similar offenses.

On the Rhine.

Our engraving presents a scene on the river Rhine, famous in song and story, renowned in history and the pride of the later generations, the scene of ancient stirring deeds, and to-day the Mecca of the tourist who visits the continent of Europe. The Rhine has many moods to suit the conditions which are forced upon it.



A SCENE ON THE RIVER RHINE.

Along the frontier between Switzerland, Bavaria, and Baden its navigation is difficult, and in many places entirely interrupted by rapids and cataracts. There the Rhine is in his wildest mood. Again, on its lower levels from Cologne to the North Sea, the Rhine is a tame, sluggish water course, so lifeless as to almost sink from sight, losing its individuality in several uninteresting branches.

During its middle course the Rhine winds its way through a broad and fertile valley, which is called the garden of Germany. Again, after passing through a narrow gorge, it reaches a plateau, where the river becomes an important route of traffic and presents some of the finest and loveliest scenery in the world, flowing along between vine-clad hills, which now and then hem it in between steep towering rocks crowned with old castles, and again opens into long, beautiful cross valleys through which smaller streams come rushing.

Our engraving shows the Rhine in one of its quieter situations. There is an old dismantled castle, it is true, to remind one that the ground is historic, but otherwise the scene is one of quiet life, the barges upon the river suggesting productive farms and other industries near the river banks. The steam vessel below shows also that the traffic is not in small amount. The scene is a lovely one.

INTENSITY OF SOUND.—M. Allard finds intensity of sound decreases far more rapidly than the square of the distance law. One great cause of the enfeeblement is the non-homogeneous nature of the atmosphere.

If Prof. Kolbe is to be believed, an atmosphere of carbonic acid gas will preserve beef sound and in flavor for some weeks, but mutton treated in the same way turns offensive in the short space of eight days.

The Cattle Industry of the Plains.

It seems that shares in cattle growing companies are becoming the fashionable investments in New York as well as abroad. We recently gave some facts about the investment of British capital in building up live stock enterprises to Colorado, Wyoming and adjacent Territories, and how well the shareholders were pleased with their investments. In New York, on Monday evening, a group of New York cattle breeders had a banquet and a discussion afterward. James A. Burden presided, and introduced as first speaker Thomas Sturgis. To show the enormously rapid growth of the stock business in the West, he cited the Wyoming Stock-Growing Association, of which he was himself a member. Ten years ago it was organized with 10 members, representing 25,000 head of cattle worth \$500,000. Today it has a membership of 100, representing 1,000,000 head of cattle, and is worth \$30,000,000. Last year they sent to market 200,000 head of cattle, which netted to the owners about \$1,000,000. The four great difficulties they had to contend with were the Indians, the white outlaws and the thieves of the border, contagious diseases and the climate. The first three had been practically reduced to nothing by the association. They had their own police, watching every outlet by which cattle could be smuggled out of the country, and

The Mission of Labor.

Labor, like everything else, has an end in view. The first aim is to make a living. Man is a feeding animal, and that want is the spur that quickens his latent energies. Hunger drives the savage to hunting, fishing, grubbing for roots, or planting a patch of corn or potatoes. Unclement weather compels him to clean out a cave or hollow log, thatch a hut, and seek some rough material, a skin or blanket for clothing. Civilization began in want. It was born of a sensation, and received its first impulse from the thrill of a nerve. Carlyle poured his fiercest scorn on the philosophy of utility, which he called the "gospel of dirt," and the German philosophers satirized it as a "bread and butter science," all alike and forgetting or ignoring the fact, that their best thoughts have been transmitted in the mysterious alchemy of the brain from pork, beef, potatoes and bread.

But labor has a higher aim than merely to feed and clothe the body, and pick bed and board out of nature, and that is, to improve, idealize and perfect our work. With varied talents, and through diversified agencies, each one is called to work out his mission as a sculptor, architect, author, editor, singer, lawyer, doctor, preacher, farmer, or laborer at some trade or handicraft. But it is a duty that each one owes to himself and humanity, to do thoroughly whatever falls to his lot. It is a manly ambition to make the most of our calling, be it to shape wheel or horseshoe, drive a stage, sew a welt, or twist a whip cracker. Ambition to excel is the spring of all progress in the practical arts and inventions. It is the healthy spirit of emulation that gives us such wonderful improvements in machinery, model farming, fruit raising, live breeds of horses, cattle, sheep, hogs and poultry.

But there is a still higher aim in labor than merely to earn our daily bread, and excel in our special calling and wear the red and blue ribbon at our agricultural fairs. It should ennoble the worker, enrich his mind, sharpen his perceptions, store his memory, regale his imagination, elevate his aims, in short, make him a fuller, riper, better man. The world is a school. Every calling is to some extent a teacher in this school, and if the farmer, mechanic or tradesman does not make his special vocation contribute to his intellectual force and manhood, it is largely a failure. Every form of business has almost illimitable relations, runs into all sorts of complexities. Take farming, for instance; the farmer, in order to thoroughly master his vocation, should know something of chemistry, in its relation to the soil; the various breeds of horses, cattle, sheep and hogs; their diseases, and the best modes of prevention and cure, and a hundred other things in relation to the farm, garden, orchard or vineyard. Every corner grocery is an epitome of the world. The products of all the zones and climates may be found in the smallest establishment—sugar, coffee, tea, salt, fish, etc. Every article opens into an immense avenue of information to any one who would feel intelligently at home in his business. Any one can learn to raise wheat, barley, apples, strawberries, how to fit a boot, cut a coat, shape a hat, weigh drugs and groceries on scales, and pace through the drudgery and routine of each day's work, but only the man who is thoroughly master of his business in all details and relations will feel that sense of manliness and independence, that consciousness of knowledge and power that is always an un-failing source of pleasure and enjoyment.

RESULTS OF NEW INVENTIONS.—Mr. Edward Atkinson, illustrating the advantage of machinery, says it would require 16,000,000 persons, using the spinning-wheel and hand-loom of less than a century ago, to make the cotton cloth used by our people, which is now manufactured by 160,000.

STEEL AN ALLOY.—Prof. D. E. Hughes, F. R. S., recently read an important article on the molecular rigidity of tempered steel before the Institution of Mechanical Engineers. From the experiments he has made, he strongly favors the view that steel, when tempered, is an alloy containing fixed carbon in a far greater quantity than when soft.

BUTTE, with its Alice, Moulton, Lexington, and others, pours a steady stream of precious metals into the lap of the country, and will continue the same work, on a large scale.

they had organized a quarantine system which had effectually prevented the introduction of disease.

Mr. Dater said he believed the most profitable industry in the West would be the raising of horses and mules. Drayage horses and mules he claimed could be raised for not exceeding \$20 per head, and this would show even a greater profit than cattle raising.

General Grant gave some interesting reminiscences of the stock business in Texas, when, in 1845, he first visited that country, and still later, when he had gone through our cattle raising territories. He had believed that by this time that section of the country would be in the same state as the South American large ranch owners, raising cattle for the mere sake of getting the hides and tallow, but the wonderful development of our population and our prosperity had made this expectation fail of its fulfillment.

VEGETATION AT THE POLES.—The retreat of vegetation from the polar regions is attributed by M. M. Rey de Morando to the gradual decrease of the diameter of the sun. He thinks that the greater center of our system was once large enough to send its rays at the same time over both poles.

In a paper on the vertebrae of the Adirondack region, Dr. C. H. Merriam says that a panther, unless very young, or when pursued by dogs, never climbs a tree; but it has a power of bounding or leaping which is remarkable. It has been known to jump from 20 to 40 feet at a single spring.

SNAKE RIVER, Idaho, has commenced to rise, but it is thought there will be less water this season than usual, by reason of the slight snow fall during the winter.

Are Miners Human?

When we read such accounts as this given by Mr. Powderly who has visited the mines in Maryland and Pennsylvania, we are led to ask—"Does civilization demand that men, human beings, men who ought to be Christians—that men made in the likeness of God must be doomed to such slavishness, to such degradation, to such hopeless misery as this?"

"I was down in Maryland not long ago, and there I met a lot of miners who had been out on a strike. The company for whom they worked wanted to reduce their pay half a dollar a day, and clap on two hours of extra work upon them, on top of that. Naturally enough the men objected. If the men had been as well organized as they are elsewhere, the thing could have been regulated without a strike. They didn't think that there were miners working in another part of the country getting out the same coal and for the same market. The men struck, but the strike was a failure, as when the men came back they saw a new kind of labor introduced in the mine, a kind of labor against which they could not compete. Let me tell you about it. When I went to that mine in November last, I saw one of the new miners. He had on a blouse of jeans, reaching to the knee, and jean overalls. There were no socks on his feet, which made a strange noise when he walked. He was as black as his clothes, which were as black as the ten of spades, which is ten times blacker than the ace; and when he came from the hole in the ground where he worked, he went into a log shed, known as a boarding-house. It was 120 feet long, built of rough pine, and with a cooking apartment at the further end. There was room for 105 men in this place, which was the eating and sleeping-room. They slept in bunks about two feet wide, which were as black as the clothes of the miners, and the tables were of equal blackness. I saw that man go into that black den and eat a mess of meal and warm water, and then tumble into one of these black bunks to sleep. On Sundays as well as Saturdays these men tumble out of bed at daylight and go to work in that grim hole in the ground. What class of men are they, do you ask? They are imported Chinese coolies and Hungarians, held there in a species of slavery which is a crime in the face of our institutions and our laws. I was speaking of those shoes. Here is one of them (the speaker produced a hideous looking oaken shoe, weighing about five pounds, with iron-shod stilt under the heel and middle of the sole to keep the foot of the miner out of the water at the bottom of the mine.) And it is as hard as the heart of the men who force their help to wear them. These begrimed miners of whom I speak work for men who are rich and pious, who are pillars in churches, and strong as philanthropists. They pray every day, "Give us this day our daily bread," but there is no daily bread for the poor creatures who delve in the mines that they may have wealth. There is meal and water for them, blackened bunks and foul tables, and seven days work in the week. This is an existing fact, not in Siberia, but in the free America of to-day, and it is an insult to American manhood. It is slavery, worse slavery than that which the liberty loving North crushed out at a cost of half a million of precious lives, and billions of dollars of treasure."

Too Much Dreaming.

A New Yorker who spent several weeks in the Black Hills country last fall met with some rare chances as soon as he left Denver. The first took him aside and began:

"Say, stranger, are you after a mine?"

"Well, perhaps."

"Do you want the biggest spec. in the West?"

"I might take it."

"Then you lay low. A sick man over here has dreamed three times running of finding the richest silver mine in the world, and I'll get all the directions as to how to find it for \$500 cash down."

The offer was not accepted, and within a few hours a second party had a "find" on hand that his brother had dreamed out. The third man wanted to sell his father's dream for \$200, and the fourth had a dream of his own to sell cheap for spot cash. When the fifth one began negotiations the New Yorker cut him short with:

"Say, don't do it! you are the fifth man who has tried the dream business on me this week. Don't you do anything but dream out here?"

"Well, there's a good deal of dreaming around this locality," placidly answered the man—"in fact, too much of it. If some of the boys don't quit the business I reckon I'll have to go back to salting up mines and selling out to Chinamen."—*Wall Street News.*

AURORA BOREALIS (NORTHERN LIGHTS).—According to Nordenskjöld, the aurora borealis is a permanent natural phenomenon in the polar regions. It appears every night, and always in the same part of the sky. The center of the aurora is a little to the north of the magnetic pole, in a plane perpendicular to the polar axis. This would be something like one of Saturn's rings, but of a very different composition, and with frequent changes of brilliancy and form.

A new kind of alum, called double alum, has been introduced in the German trade. It is a transparent sulphate of alumina, but has a larger proportion of the latter than usual, and is free from iron and acids. For many industrial purposes, such as the preparation of paper, etc., it will, it is claimed, present some advantages.

USEFUL INFORMATION.

The Manufacture of Fireworks.

A visitor to one of those case making sheds, in which a good fire may be roaring in an open fireplace, will perhaps be rather startled to notice a number of barrels and jars. The receptacles represent the most modern development of the pyrotechnic art. Dip into this barrel and bring out a little of its contents on the point of a knife and hold it in the dark part of that gas flame. It is arsenite of copper and sal ammoniac, and instantly the light of noon-day is overpowered with blue glare. We make another dip and bring out a little chlorate of baryta, and a dazzling outburst of green is the result when placed in the flame. Here is a barrel of sal ammoniac which is combined with color giving substances to give depth and intensity. Another receptacle holds chlorate of potash, a source of oxygen gas, without a good supply of which fireworks can not be expected to be very bright. Some of the coloring substances are very perilous. If, for instance, a little of a compound of nitrate of strontia and sulphur and potash—the source of the most vivid red color known to chemists—should be left after a display, it is always either fired or buried. It is too dangerous to attempt to store. Fifty years ago colored fireworks were unknown, or nearly so.

The most delicate and interesting feature of modern firework making is the charging of Roman candles. The public like to see these balls thrown out with exactly an equal force so as to play within the same sphere. To secure this, very careful adjustment is necessary. The fiery balls of color are little lumps of composition filled into the case, and separated from each other by a layer of "dark fire," a little charge of gunpowder being just underneath. If all the charges were alike, every ball would be thrown out a little farther than its predecessor. To obviate this, the charge is increased as the tube is filled up. The workman, therefore, has before him a series of little scoops of different sizes for measuring the powder, the smallest being used for the first ball, and the largest one for the ball at the mouth of the tube.

Of all fireworks, the rocket is the most beautiful, and certainly is the most curious in structure. Some of them are said to rise to a height of more than a third of a mile, and this flight is secured by running in very tightly into the rocket case a composition which burns fiercely, and generates very rapidly when once lighted, but has only a very small vent for its fury at the lower end of the case. The gas instantly rushes out with such violence that the rocket is driven upwards by it, the tail consisting of the sparks of the fire burning within.—*American Inventor.*

TESTS OF DIFFERENT DISINFECTANTS.—A resume of the results arrived at by the St. Petersburg Academy of Science, in its investigations of the different antiseptic substances and disinfectants so called, appears to be somewhat at variance with opinions held elsewhere. According to the report given carbonic acid is most efficacious in preventing the formation of ammonia and the development of inferior organisms by the decomposition of organic matter, and it is, in consequence, the best antiseptic. Oil of vitriol, the salts of zinc and charcoal, are the most active for neutralizing the foul odors originating from putrid matter. Chloride of lime and permanganate of potassa act promptly in destroying the inferior organisms found in putrid liquids. Generally speaking, these disinfectants retard, in a measure, the development of putrefaction in organic matter, but their influence is only momentary; as regards the purification of apartments, their influence is but feeble, if not totally ineffectual, by reason of the small degree of concentration of their elements. For buildings not inhabited chlorine and nitrous acid are the best.

FLINT LOCK GUNS.—One of the most important of Birmingham industries is the gun trade. A very large number of shot guns go to America from here every year. Many fine fowling pieces are included, but still most of the guns are of a very cheap kind. A strange branch of the gun business here, says Consul King, is the manufacture of guns for the east and west coasts of Africa. These weapons are still made in great numbers, and usually have very long, bright barrels, and old-fashioned flint locks. It seems that the natives of the African coasts and interior prefer flint to percussion locks, because of the difficulty of procuring caps. The guns for this trade are very cheap, some selling as low as five or six shillings apiece at wholesale; but every barrel has to be tested at the Government proof house, the same as if intended for the finest of hammerless breech-loaders.

TO RENDER SILK LUSTROUS.—The following bath is recommended for rendering black dyed silk more lustrous and shining: Dissolve two pounds of soda crystals in ten gallons of water. To this bath olive oil is added in sufficient quantity, and until the oil begins to float on the bath. The addition of acids to this bath is not recommended, but if the silk has to be deprived of the whitish shine it acquires in the above bath, it can be washed in water in which citric, tartaric, or acetic acid has been dissolved.

NEW PRINCIPLE IN RICE MILLING. The *Sugar Bowl* call the attention of rice planters to an invention which introduces a new principle in substituting for the vertical movement in common use, whereby rice is decorticated by a species of pounding, a rotary motion wherewith the grains of rough rice are decorticated and polished through a simple friction with each other. The object sought is to avoid the breakage of grains and the pulverization of husks, which has cost so much time in winnowing and separation of the broken grains.

RUBBER LUBRICATOR FOR BELTS.—Five parts of India-rubber are cut fine and melted together with five parts of oil of turpentine in an iron well-covered vessel; then add four parts of resin, stir well, melt, and add four parts of yellow wax, stirring constantly while melting. This mixture while warm is added, with constant stirring, to a melted mixture of fifteen parts fish oil and five parts of tallow, and the whole is agitated until it has congealed. The mass is applied to old belts upon both sides in a warm place, and when the belts are in use, from time to time upon the inner side. By this treatment they become very durable.—*Chem. Centralblatt.*

ADULTERATION IN FLOUR.—The following mode of detecting adulteration of flour is furnished by a foreign correspondent: If flour is heated with 70% alcohol and 5% muriatic acid, the liquid remains uncolored if the wheat or rye flour is pure. It turns yellow if adulterated with barley or oatmeal, orange color with corn meal, and red with beans or cockle.

TO PREVENT THE HAIR FROM FALLING OUT, use a mixture composed of two ounces of spirits of ammonia, two ounces each of glycerine and rose water, one half ounce of cantharides and enough alcohol to clarify.

TO TAKE OIL SPOTS OUT OF MATTING, ETC., wet the spot with alcohol, rub it with hard soap, and then wash well with cold water.

GOOD HEALTH.

Should Men Cut their Hair?

A correspondent of the *Phrenological Journal* writes as follows:—Whether the hair should be cut I could never quite satisfy myself. As a phrenological practice, I seriously doubt the propriety. Every cutting is a wounding, and there is some sort of bleeding in consequence, and waste of vital force. I think it will be found that long lived persons most frequently wear their hair long. The enting of hair stimulates to a new growth, to supply the waste. Thus the energy required to maintain the vigor of the body is drawn off to make good the wanton destruction. It is said, I know, that after the hair has grown to a certain length it loses its vitality at the extremity and splits; whether this could be so if the hair should never be cut, I would like to know. When it is cut a fluid exudes, and forms a cicatrix at each wounded extremity, indicating that there has been injury.

I wish that science and civilization had better means for preserving the hair. Baldness is a deformity, and premature whiteness a defect. If the head was in health, and the body in proper vigor, I am confident this would not be. I am apprehensive that our dietetic habits occasion the bleaching of the hair. The stiff arsenic hat is responsible for much of the baldness. Our hats are unhealthy. I suppose there are other causes, however. Heredity has its influence. Certain diseases wither the hair at its roots; others lower the vitality of the skin, and so deplete the body. I acknowledge that the shingled head disgusts me. It cannot be wholesome. The most sensitive part of the head is at the back where the neck joins. That place exposed to unusual heat or cold is liable to receive an injury that will be permanent, if not fatal, in a short period. The whole head wants protection, and the hair affords this as no other protection can. Men have beards because they need them, and it is wicked to cut them off. No growth or part of the body is superfluous, and we ought, as candidates for health and long life, to preserve ourselves from violence or mutilation. Integrity is the true manly standard.

HEADACHE.—The *Boston Journal of Chemistry* thinks that the headaches that many thousands wake up with every morning are brought about by kerosene lamps "turned down low." A small flame in a lamp chimney does not cause enough draft to insure complete combustion, and slumberers breathe carbon and carbonic acid gas as literally as if they stood over the chimney of a petroleum refinery. A little light may be supplied in a bedchamber, if any is required, by a specially prepared taper, by a candle, or by a wick floated in animal or vegetable oil; but the turned down kerosene lamp can not be used except to one's discomfort. Dr. Haley says that as a rule a dull, heavy headache, situated over the brows and accompanied by languor, chilliness and a feeling of general discomfort, with a distaste for food, which sometimes approaches to nausea, can be completely removed in about ten minutes by a two-grain dose of iodide of potassium dissolved in half a wineglassful of water, this being sipped so that the whole quantity may be consumed in about ten minutes.

Growth of Hair and Nails After Death.

The following extract from the "Acts of Leipzig," may possibly be of interest: "In the year 1719 a woman was interred at Nuremberg in a wooden coffin. The earth wherein her body was deposited was dry and yellow. In 1761, the grave was dug up anew. To the surprise of the digger, he perceived a considerable quantity of hair that had made its way through the crevices of the coffin. The lid being removed, there appeared a perfect resemblance of a human figure, the eyes, nose, mouth, ears, and all other parts being very distinct, but from the crown of the head to the soles of the feet it was covered with very long, thick and frizzled hair.

The learned Honoratus Fabri (lib. 3, De Plantis), and several other authors, are of opinion that hair, wool, feathers, nails, horns, teeth, etc., are nothing but vegetables. If that be so we need not be surprised to find them growing on the bodies of animals after death, a circumstance that has occasionally been observed. Petrus Borellus pretends that these productions may be transplanted as vegetables and may grow in a different place from that where they first germinated. He cites in some observations on the subject, among other examples, that of a tooth drawn out and transplanted. [The transplanting of teeth has, of late years, become quite common.] In the "Philosophical Collections" of Mr. Hooke, it is stated that a man hanged at Tyburn for theft was found shortly after his removal from the gallows to be "covered over in a very extraordinary manner with hair."

In a letter addressed by Dr. Bartholin to Mons. Sachs, which is inserted in the "Acts of Copenhagen," occur the following words:

"I do not know whether you ever observed that the hair which in people when living was black or gray, often after their death, in digging up their graves or opening the vaults where they lie, is found changed into a fair or flaxen color, so that their relations can scarce know them again by such a mark. This change is produced, undoubtedly, by the hot and concentrated vapors which are exhaled from the dead bodies."

During the Crimean war an officer well known for his fine beard died, or was killed in action. He was buried, wrapped in his blanket. A little while afterwards his body was exhumed, for some reason, and it was said that his beard had grown through his blanket.

AN UNALTERABLE FACE.—There is said to be a man in Bellevue Hospital, New York, with a face that never alters its expression in the slightest degree. Something is the matter with the nerves and muscles so that they do not work at all. Not the faintest smile nor the suggestion of a frown ever varies the stolid monotony of his countenance. The features are regular and rather handsome, there being no distortion, or any outward evidence of the affection other than the strange immobility. His name is Henry Stube, but he is called "Masky," because his face is like a mask, behind which he laughs and weeps unseen. He has worn this mask of his for two years. He acquired it after a neuralgic cold. He is being treated with electricity chiefly, and the physicians think he will recover. In the meantime he parts his lips with his fingers for the introduction of food and water, and when he sleeps his eyelids are held shut by a slight bandage. His imperfect talking is done without moving his lips, and when he speaks or listens the impassiveness of his face looks singular, indeed. There is something uncanny about it, and, after the idea has once got into your mind, you can hardly regard this face as anything else than a mask.

A SINGULAR CASE.—Albert Duren, the great artist had to endure great grief on account of a singular manifestation of temper and conduct on the part of his wife. He finally sank under the affliction, when his wife becoming alarmed at his condition was able better to control her feelings and conduct, and did everything to aid and comfort him. During his sickness she, for the first time, told him the cause of her own trouble, which she had been unable to control. Her malady—for such it was—arose from a hurt in her head, which she received from a fall when quite a young girl. The injury, on examination, was perceptible to the eye in the form of a small depression. In certain conditions of the weather, particularly during the continuance of east winds, she suffered intensely in the head, which physicians attributed to chronic inflammation of the envelope of the brain, in the region injured. The diseased condition of her brain developed itself in the way and manner above described.

IMPORTANCE OF EXERCISE.—Dr. Cathcart, Lecturer on Anatomy in the Edinburgh School of Medicine, gives some striking facts as to the effect of systematic exercise in expanding the chest. At a school for boys where regular exercise was compulsory, new pupils, aged fourteen, were found to have an average chest measurement of 29.3; at fifteen they measured 30.16; at sixteen, 32; at seventeen, 32.6, and at eighteen, 32.5. Pupils who had been for some time in the school measured, at the same ages, 30.6, 32.1, 34.2, 35.8, and 36.8.

DEATH, in our view, takes place when the action of the heart ceases, but to the Chinese a person is alive until the body becomes cold. These two beliefs may cause estimates of the time of death of any individual to differ by several hours, which difference has given rise to some very unsatisfactory evidence at inquests in Hong Kong, the Chinese idea having been unknown to Europeans until very recently.



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SAN FRANCISCO:
Saturday Morning, Mar. 31, 1883.

TABLE OF CONTENTS.

EDITORIALS.—The Southern Exposition; Smelting Copper Ores in Mexico, 217. A Great Legal Warfare, 218. Passing Events; Delinquent Mine Partners; The Solar Eclipse of May 6th; Mining Plants; Mine Timberlog, No. 6, 224. The Mining Bureau; Steel Wearing Surface for Ore Crushers, 225. Patents and Inventions; Notices of Recent Patents, 228.

ILLUSTRATIONS.—Mexican Copper Smelting Furnace; The Southern Exposition Building, 217. A Scene on the River Rhine, 222. Dodge's New Improved Rock Breaker for Mining and Engineering Use, 225.

CORRESPONDENCE.—Keep the Slickens in the Mountains, 218. Notes from Eureka, Nevada, 225.

MECHANICAL PROGRESS.—Resharpener Files; The Gas Engine; Steel Wire Pipes; The Corrosion of Iron and Steel; Monster Steam Whistles; A New Copper-Zinc Alloy; To Protect Iron and Steel from Rust, 219.

SCIENTIFIC PROGRESS.—The Movement of Water in Plants; Underground Temperature; The Red Spot on Jupiter; Use of the Microscope in Brewing; The Effects of Oil upon Waves; Water to be Carried as Gas, 219.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends and Bullion Shipments, 220.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon and Utah, 220-21.

USEFUL INFORMATION.—The Manufacture of Fireworks; Tests of Different Disinfectants; Flint Lock Guns; To Render Silt Lustrous; New Principle in Rice Milling; Rubber Lubricator for Belts; Adulteration in Flour, 223.

GOOD HEALTH.—Should Men Cut their Hair; Headache; Growth of Hair and Nails after Death; An Unalterable Face; A Singular Case; Importance of Exercise, 223.

MISCELLANEOUS.—Official Villains on the Rhine; The Cattle Industry of the Plains; The Mission of Labor, 222. Are Miners Human?; Too Much Dreaming, 223.

NEWS IN BRIEF.—On page 228 and other pages.

BUSINESS ANNOUNCEMENTS.

Boiler Cleaning Compound—John Taylor & Co., S. F. (Glassware)—Whitall, Tatum & Co., New York and Phila. Dividend Notice—Bulwer Consolidated Mining Co. Contract to Let—F. E. Birge, S. F.

Passing Events.

For California, we have had a great event, and one long looked for, but nearly given up—that is, a rain storm. The long continued dry weather has been bad for miner, farmer, and the whole community. Many persons had fears of a very bad year to come, but the long expected rain has banished all fears, and given rise to great rejoicing on all hands. The downpour has been general, and has not been niggardly. An abundance of water has fallen. The mining and agricultural communities both are benefited, and the whole State is a gainer by millions of dollars.

From the mining regions there is little news of moment. The storm will set back prospecting a little in some regions, but in others it will forward it. The ditches will now be running full, and a good season may be expected.

For the third or fourth time in the history of the Comstock, buildings are being removed and hauled to and set up in new camps. In 1863 a number of buildings were torn down and taken to Reese River, Austin. In 1865 Meadow Lake came in for a share of the Comstock houses. In 1869 houses were torn down and hauled from Virginia to White Pine. This time houses that are useless on the Comstock are being hauled to Hawthorne, the coming metropolis on the line of the Carson and Colorado railroad.

A NUMBER of Comstock prospectors are preparing to go out into the new country at and about the present terminus of the Carson and Colorado Railroad.

Delinquent Mine Partners.

There is no greater nuisance than for a miner to get a partner in a claim with him who will not do his share. Under the old laws it was quite difficult to get rid of him, and even under the provisions of the existing laws there are certain forms which must be gone through, which take time and are of more or less trouble. Still there are means of ridding one of a non-paying partner. These means we detailed at some length a few weeks since. It must be remembered, however, that the U. S. mining laws provide only for removing a partner who fails in paying the required expenditures—that is, what the U. S. laws require—and as far as not paying the actual expenditures recourse must be had to the courts.

There are some other details which mine owners afflicted with delinquent co-owners should remember, and more especially when they are going to patent their claims. Where a party proceeds against one or more of his co-owners, under the U. S. mining laws, he should file with his application for patent a copy of the original notice of location; an abstract of all conveyances made of the claim; a copy of the notices published to delinquent co-owners—which notice should embrace the names of all delinquents—to which must be attached the affidavit of the publishers of the paper in which the notice was inserted, that the attached notice was published for the period of ninety consecutive days, giving dates; the affidavit of the claimant or claimants who have made the required expenditures, corroborated by the sworn statements of two or more disinterested witnesses, showing the character and extent of the improvements made upon the claim, and the time when the improvements were made. There must, also, by the rules of the Land Office, be filed, the sworn statement of the claimant or claimants who had made the required expenditures, as to whether or not either of the parties whose names appear in such published notice, contributed his proportion of the required expenditure, either during the ninety days' notice by publication, or the succeeding ninety days. The evidence must be full, positive and explicit on all these points. Miners applying for patents should call the attention of their attorneys to any delinquency of partners at any time previous, in order that all these precautions may be taken, and the time, expense, and annoyance of a rejection may be prevented.

Mining Plants.

Perhaps as much harm has been done to the mining industry in the matter of making mistakes about new plants of machinery for mines as in any other way. The advisability of placing a limit on the otherwise costly business of putting down new plants is a subject seldom properly discussed by large companies. It is not always a recognized necessity to have accurate calculations made beforehand as to the proper size, strength and description of machinery, etc. Of course, the foundrymen know how to make the machinery so that all that part will be all right, but they build to order, and it often happens that very big machinery is made for very small mines. The advice of competent and experienced men should always be taken, and the whole subject be very thoroughly canvassed before active steps are taken. The makers of machinery in this country are skilled in their work, and with their varied experience are familiar with the best forms of mechanism which have proved successful.

At a recent meeting of the "North Staffordshire Institute of Mining and Mechanical Engineers," Mr. James Lucas, the newly elected President of the Institute, gave some views on this subject, more particularly with reference to the forms of machinery, appliances, etc., in use in collieries there.

Regarding winding engines he considered that vertical were far preferable to horizontal, although the first cost was considerably more, as there was not nearly so much wear and tear—for instance, they avoided any piston drag. There was an idea now afloat, that in the case of a horizontal engine, the piston swam in the steam in the cylinder. This might be perfectly true in theory, but from practical experience there was no doubt that such was not the case; he also found from experience that the more they could simplify the machinery the better it acted. As to ropes, it was first of all necessary to determine the proper strength of rope required to do a certain amount of work, and also if iron or steel would be best under the peculiar circumstances. Drums were

as important a part of the winding machinery as anything else connected therewith. For his own part he considered (if round ropes were used) that a drum of a slightly conical shape—say one in four—was best; and in all cases it was very necessary for the rope to coil on timber. If they had water to deal with in any quantity, it was most important that the utmost care should be taken to determine the best winding or pumping appliances which would be suitable to the task. If it was decided to pump the water, in his opinion a direct-acting engine was the most economical and efficient in its action.

As to the pumps, it then remained to be decided whether it was advisable to use rams or lifting buckets, or both; the description and strength of trees; the class of joint best suited to resist the pressure; the sort, size, and position of clacks, so as to be easy of access in case of any repairs being needed; and lastly, but not least, it was indispensable that all the trees and fittings should be tested before being put in, but not up to such a pressure as to strain them, as over testing was liable to produce permanent defects. It was very necessary for the safe and successful management of a mine that it should be laid out and ventilated in a thorough, workmanlike manner, for the safety of the men should always be the manager's first care. The speaker remarked upon the need for continual vigilance on the part of the mine management, to avoid waste in getting, and in the use of, stores of various kinds.

Mine Timberlog—No. 6.

Economizing Timber in Mines.

One of the great items of cost in mining operations is the timber. This, of course, depends greatly on location of the mine with relation to railroads or timber supply. But in any case in the employment of so costly a material as timber it is important that every means should be adopted for reducing the quantity required. It is, of course, impossible to proportion the dimensions of the timber to the strains to which it will be subjected, for the reason that these strains are wholly unknown. The pressure which a descending mass of rock will exert cannot be estimated; all that is known about it is that it may be very great, and hence an excess of material is placed to resist it. But though we are unable to economize timber in these directions, some reduction of the quantity may be obtained by a little attention to the rudiments of the resistance of materials. An observance of fundamental principles will here enable us at least to get from the timber employed the greatest resistance of which it is capable.

The materials of which the supports in a mine are composed may be subjected to a crushing strain in the direction of their fibers, or to a transverse breaking strain, and it becomes important so to place the pieces relatively to the strains to be thrown upon them, that they may be capable of offering the maximum resistance. If the strain is one of compression, it will be best resisted when it acts in a direction parallel to the fibers of the wood, and to secure this condition the support should be placed so that its length may be exactly in the direction of the pressure. Thus, in inclined seams, it is desirable to place the props at right angles to the floor, that is perpendicularly to the planes of stratification. As, however, the roof will sink slightly in spite of the prop, the latter may be made to deviate very little from the perpendicular in the direction of the vertical. If the pieces are long it may be necessary to stay them in the middle to prevent yielding by flexure. When the strain is transverse, the length of the piece should be reduced as much as possible by supporting it at frequent intervals, and care should be taken that it rests evenly on the supports. Provision should be made for distributing the pressure equally throughout the length of the piece by inserting wedges where the rock does not bear. These are principles which any intelligent and experienced miner may understand and apply. Such a man will see at a glance where the pressure comes from, and determine in a moment the direction in which the axes of his timber should be placed so as to resist it most effectually.

As mining timber is generally purchased in considerable quantities, it is important to its preservation that it be perfectly stored or sheltered from the weather. Where possible, a covered building should be chosen, and means of ventilation provided. Large pieces may be stacked horizontally and crosswise, but smaller ones are better placed on end. It is needless to remark, that in using from such a store the oldest pieces should be chosen first. Young trees are to be preferred to the tops of old trees, which are spongy in texture, and less resisting and durable than the lower portions.

The Solar Eclipse of May 6th.

EDITORS PRESS:—In my recent letter, I believe I was under the impression that the largest of the Tonga Islands, Tongataboo, and Eoa ten miles southeast of it, were included in the belt of totality of the solar eclipse of May 6th. Upon laying down a small sketch, which I enclose, and some larger maps they best explain that Flint, Caroline and Masse or Hiavo, the latter on the north of the Marquesas group, can be alone included. Hiavo is, I believe, about 140° 30' west longitude from Greenwich, and 7° 50' south latitude; Caroline island about 150° 30' west longitude and 3° 50' south latitude, and Flint island about 152° west longitude and 11° 20' south latitude. There must be some discrepancy in Lippincott's longitude of Hiavo, as it differs essentially from the position given by Capt. Wilkes in his chart of the United States Exploring Expedition, as well as Colton's Atlas enlarged group of the Marquesas. I have, therefore, preferred to adopt the position given by Wilkes and Colton.

The route from the east via San Francisco seems preferable to Panama for Hiavo, being only about 2,800 miles from San Francisco; a first-class steamship if chartered for the purpose need not take more than nine or ten days, which, with seven days from New York by railroad, makes seventeen days, while the New York papers reported that Prof. Halden and party left New York March 24, and expected to reach Callao by the 22d, and then it would take twenty-five more days by ship, a Government vessel, to Caroline island, making forty-five days compared with seventeen via San Francisco. Caroline island is also 600 miles further than Hiavo or Masse.

A. F. GODDARD, C. E.
Sacramento, March 27th.

An Important Mining Case.

The case of the Boston and Arizona smelting and reduction Company against the owners of the Merry Christmas mining claim, just tried and decided in the district court here, is, perhaps, the most interesting case that has been tried in this county, by reason of the questions of law involved in it. It has attracted great attention, particularly from mining men.

The plaintiff owns the Knoxville mine, and brought suit against the Merry Christmas to try title to a portion of the Knoxville ground, covered by the Merry Christmas. The Knoxville was located May 6, 1868, and the Merry Christmas December 25th of the same year. The plaintiff urged that the Knoxville was a valid location, and that the ground in dispute was attempted to be located by the Merry Christmas while the Knoxville was a lawful and valid location, and that, by reason of this fact, the Merry Christmas location was invalid at the time it was made, and being invalid at that time, could never become a valid claim under the original location, even if the Knoxville claim should afterwards lapse, by reason of any subsequent failure to comply with the requirements of the law.

The Merry Christmas, on the other hand, urged that the Knoxville was not a good location under the law, by reason of the fact that the claim was not completely monumented when located, and that even if it had been, the plaintiff could not recover because defendant had been in adverse possession of the disputed ground for more than two years.

The court charged: That if the initial and end monuments of the claim were put up at any time before the Merry Christmas was located, the location of the Knoxville was good against the Merry Christmas, and if it was good, the location of the Merry Christmas was illegal and void, and never could become valid under that act of location, and consequently, the statute could not run in favor of the Merry Christmas as against the Knoxville. Verdict for the plaintiff. —*Tombstone Republican.*

The Supreme Court of the United States has dismissed, with costs, on motion of counsel for the applicants, the following well-known California cases, viz.: J. C. Flood et al., appellants, vs. John H. Burke; J. W. Mackay and J. G. Fair, appellants, vs. John H. Burke; J. C. Flood et al., appellants, vs. John H. Burke; and J. W. Mackay and J. G. Fair, appellants, vs. John H. Burke.

THE southeast drift on the 2500 level of the Con. Virginia is very hot. Not much work has been done in the face during the week. A cooling-house has been constructed out near the front and a second air pipe carried in. As it was the men had so far to travel back through the drift after cooling off that they were about as badly off when they got back to the face of the drift as they were when they left it.

A GOOD FIND.—The Sierra county Tribune says: Three yeast powder cans, filled with gold, were found yesterday among the ruins of the Hald Mountain Co.'s office at Forest City. It is not known how the gold came there, and the members of the company are completely mystified. They believe that it was placed under the building previous to the fire, as it could not have been secreted in the office.

THE flow of water from the Sutro tunnel is over 1,000,000 gallons, in twenty-four hours, more than it was a week ago.

The Mining Bureau.

We have several times referred to the fact that the State Mining Bureau was short of funds, and that the Legislature was to be asked to appropriate an additional amount to that yielded by the tax on the transfer of mining stocks. The Legislature appropriated \$10,000 for two years. The lowest income yet experienced from the tax on mining stocks is some \$400 per month, so the legislative appropriation makes the total income something over \$800 per month. The State Mineralogist states, however, that this is not sufficient, and makes an appeal to enable him to keep the museum open. In answer to circulars sent out to mining men the following gentlemen were present at the meeting of the Bureau on Monday: Melville Attwood, W. M. Bunker, J. H. Carmany, William T. Coleman, J. L. Davis, W. B. Ewer, S. Heydenfeldt, Jr., J. M. Keeler, J. M. McDonald, George T. Marye, A. B. Paul and Charles M. Tyler. Mr. Coleman was called to the chair, and Mr. Heydenfeldt acted as Secretary.

Mr. Hanks, the State Mineralogist, read an address detailing the work done by the Bureau, and describing the rigid economy which had been practiced to keep the institution running. He states that it is the experience of the management that the original Mining Bureau fund

for study and reference. This has already been done largely, and can be increased to an almost unlimited extent if the necessary funds can be made available. In consideration of the facts herein stated, I feel it to be my duty to appeal to the citizens of San Francisco and the State before taking the responsibility of closing the Museum.

After discussion of the affairs of the Bureau, a committee of five was appointed, consisting of Messrs. Paul, Heydenfeldt, McDonald, Bunker, and Tyler, as a committee of ways and means, to devise some plan of appealing to the citizens of the State to come forward and assist in maintaining the Mining Bureau until the next session of the Legislature.

Notes From Eureka, Nevada.

[From Our Regular Correspondent.]

EDITOR'S PRESS: Nothing unusual has happened during the past week in our quiet camp. All our matters are in the same state as they were a week ago, but it is thought that a settlement may be made in a few days. The new machinery at the Eureka Con. mine, I am informed, has also been paid for. The assessment was levied for prudential reasons, the company believing it better to have reserve funds in their treasury than to be in debt. Considerable interest has been shown during the past few days

limestone. Open seams occur in this, and the ore is found close to them. A short distance below the Dug-Out dump is a tunnel entering the hill, and running 150 feet N. 70 E., which has passed through a wide fissure filled with wash and cement. This measures seven feet between the walls, and, it is thought, will prove the main fissure upon which the ore will make great depth. Lower down on the hill is another tunnel, now in about forty feet. Near the entrance is a well defined quartz vein, showing a large proportion of antimony, which strikes N. 15 W., and dips northeasterly into the hill. No assays have yet been had from this, but, judging from appearances, it is also a valuable discovery.

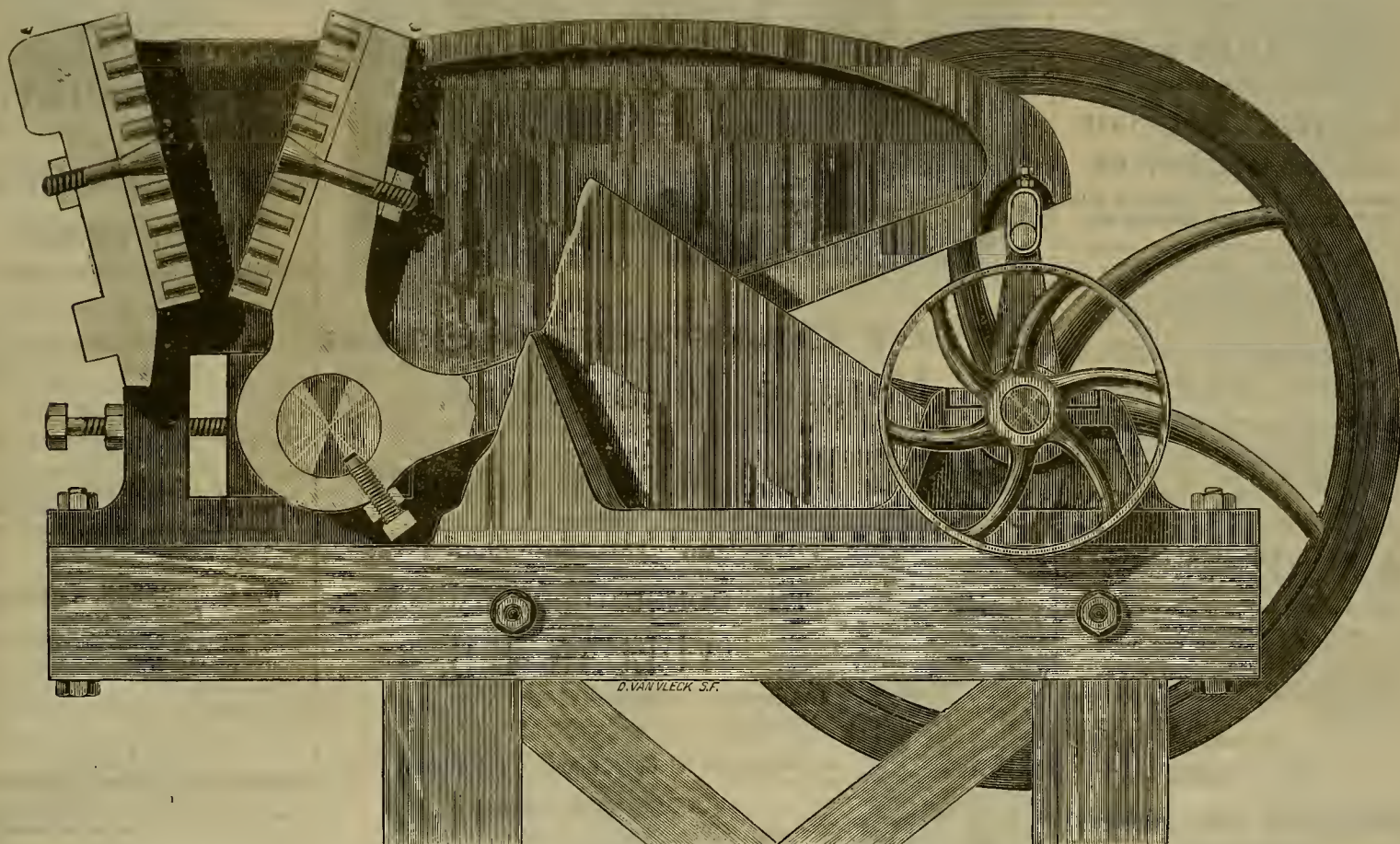
In order to explore the mine at as great a depth as possible without the aid of machinery, as well as to make access to it easier than at present, a tunnel has been driven into the hill near the base, commencing on a location known as the "Trail," and running N. 10 E. 180 feet. At the face the rock, unlike the cap, is soft and broken. In it are small veins and seams of ore, that are evidently thrown out as feeders from a main channel further in toward the center of the hill. A lateral drift has been commenced from this tunnel and is now in 100 feet. It is intended to intersect both the quartz vein above mentioned, and the main ore fissure. It will probably tap the latter at a depth of 300 feet from the surface. As the section of

and Pacific Tunnel Co. adjoin the Excelsior, and likewise contain large bodies of ore. Both are mainly low grade, dry ores (i. e., not containing any lead.) It is probable that a process will be found by which they may be worked to advantage in the future, and it is my intention to make proper inquiries in relation thereto.

At the Herculean mine, on Adam's Hill, a great improvement has taken place lately in the quality of the ore, and judging from the immense deposits it will develop into a very valuable property. The Oriental and Belmont mine, also on Adam's Hill, has been bonded for sale to San Francisco people. This is a valuable property; the title is good, and it has produced quantities of ore from time to time, aggregating not less than \$200,000. Yet at no one point has a depth below sixty feet been attained.

The Rocky Point mine, on Hoosac Mountain, has been leased to a party of practical miners for six months, with the privilege of one year. Some very high grade ore has been taken from this property, and the formation is favorable for a good deal more.

At the Geddes and Bertrand mine in Secret canyon, Burleigh drills are to be introduced for the purpose of driving the tunnel from the mill to connect with the 150-foot level of the mine. The length of the tunnel will be 900 feet. The Bertrand Co. shipped last week, thirteen bars of refined silver bullion containing 10,653



DODGE'S NEW IMPROVED ROCK BREAKER FOR MINING AND ENGINEERING USE.

can not be depended on, and should not be taken into future calculations.

He says: "The appropriation by the last Legislature will suffice for the rent of a suitable office, for traveling purposes, the making of creditable reports on the mineral resources of the State, a continuance of the correspondence, and the care of the collections, but it will not support the present museum. The transfer tax will pay all the expenses of the contraction and leave the appropriation intact, unless it should diminish more rapidly than is now anticipated.

"It has long been evident that the State Museum was becoming too extensive and valuable to be managed by a single individual. The experience of the last three years has shown that there is a great future for the institution, if properly managed, and it is well worthy of the fostering care of the State. But it has already become so extended in its scope that any person familiar with the facts would be eminently conceited who would undertake to manage it without the advice and assistance of others. Under this conviction I asked, in my report to the Governor, 'that a Board of Trustees be appointed to share the responsibility and management of the State property, leaving the State Mineralogist free to travel, to investigate and report upon new discoveries, and to conduct the scientific departments with his assistants.' This was recommended by the Governor in his message, and, although no action was taken, I am still as strongly impressed with its importance as before, and for this reason I have asked you to consult with me, and to advise me what to do under the present circumstances.

"It is the province of the State Mining Bureau to seek locations of new minerals having an economic value, to learn their quality and extent, and to place specimens in the Museum

in some small specimens of wire silver that were brought in from

The Dug-Out Mine.

I visited the property to-day. It is situated on the southern portion of Prospect mountain, at a point where the latter joins the Spring Valley range. It was located in August, 1879, and since then considerable development work has been done. It was discovered by tracing rich float-rock, and the Dug-Out mine was duly located. The vein, at the point of discovery, was eighteen inches in thickness. Assays of the top rock ran from \$50 up to \$1,159 per ton. The first shipment that was sent to the furnace worked at the rate of \$241 per ton, and sufficient of this was taken from the surface to realize for the owner \$3,000 net before a hole even three feet deep was sunk upon it. A fine pocket of ore was found directly beneath this, which realized \$10,000 net.

Another pocket or chamber has also been opened from the surface. The latter is about forty feet long, twenty feet high, and vein about six feet in thickness; the pulp assays from the ore sent to the furnaces went from \$34 up to \$258 per ton. Still another chamber beneath the latter was emptied of its treasure, and it has since been filled up with waste rock. How many more pockets are yet to be discovered in this mine remains to be seen; no one can see in a mine beyond a pick's point. Fully 100 tons of ore, chiefly high grade, has been taken out, and now awaits shipment to the smelters. At points close to the surface there is still ore remaining in place, and from one of these I secured some very nice specimens, having an appearance similar to very small tufts of grass sprouting from the rock, but differs, inasmuch they are of pure white wire silver. The country rock near to the surface is very hard, white

country in which the Dug-Out mine is located is comparatively a

New One to Prospectors.

It is probable that it will soon become a point of great interest to mining men in this locality. At the Great Republic mine on the west side of Prospect mountain 150 tons of ore awaits shipment, and at the Banner are 160 sacks of good ore which will be sent to the furnaces in a few days.

At the Dug-Out mine, adjoining the Banner, a new strike has been made on the main tunnel level of from three to four feet in thickness, of rich, bright, carbonate ore. On a level sixty-five feet below the tunnel is what appears to me to be the most promising part of the mine. The formation is large, and shows evidence of more extensive ore chambers than any that have been discovered above it, iron and low grade ore showing in beautiful proportions. At the Industry mine, a fine vein of quartz ore has been discovered from the surface. This is a valuable property, and one that has seldom been out of ore since the day it was located, which was early in the year 1869.

The new engine at the Eureka tunnel is being set in place. There is no change apparent in this mine. Ore shipments are being made regularly, as usual. At the Vanderburgh mine, a new location, there is a good prospect in a drift west from the shaft, now down sixty-five feet from the surface. The drift is in ledge matter fully twelve feet in thickness, and valuable developments are anticipated. Tributaries are at work in the Excelsior mine, following veins of ore that work from \$100 to \$130 per ton. There are large bodies of ore in this mine that have been developed from the surface to a depth of nearly 800 feet, but which do not pay to work at present. The mines of the Atlantic

ounces. Twenty-eight thousand seven hundred and eighty-one pounds of ore shipped last week from the Silver Nugget mine on Silverado mountain, Pinto district, to the Richmond furnaces yielded from \$55.73 to \$281.08 in silver, per ton, and forty per cent. of lead.

In my next I shall endeavor to give you a particular account of the Ruby Hill mines.

M. H. JOSEPH.

Eureka, Nev., March 26, 1883.

Steel Wearing Surface for Ore Crushers.

Miles B. Dodge, of this city, obtained last week, through the MINING AND SCIENTIFIC PRESS Patent Agency, two patents for improvements on his rock breaker, which has been so many years in use. Both patents covered means for increasing the durability of the faces of the jaws. The engraving presented herewith shows the preferred form which Mr. Dodge some little time since adopted.

It will be seen that the wearing plates are studded with hardened steel pins, put in thickly in a plate of wrought iron. The plate wearing away from the steel pins leaves them projecting as high points thus splitting the rock in pieces with very little power. The plates last very much longer and more effective service is obtained from them. This cut represents the No. 2 rock breaker, but with the other three sizes two fly-wheels are used. The No. 3 is 6x7 for the assaying and sampling. The size shown is for ordinary mills. The No. 1 is 12x9 for heavyest mills; and the No. 0 is a big one, 24x20, for macadamizing, coal breaking, etc. With the steel-studded wearing plates, these machines are extremely durable.

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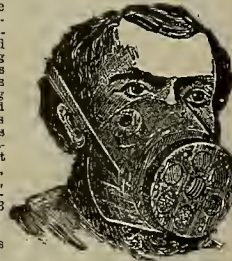
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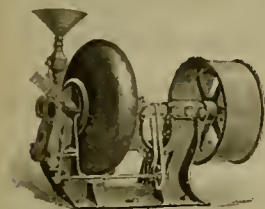
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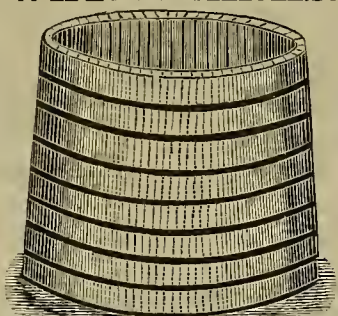
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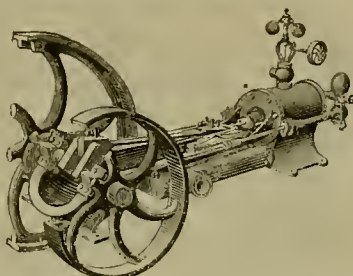


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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR THE WEEK ENDING MARCH 20, 1883.

- 274,279.—GUN FOR DESTROYING ANIMALS—Crepin & Rochat, Hollister, Cal.
 274,183.—TWO WHEELED VEHICLE—Geo. W. Dutton, Tomales, Cal.
 274,298.—ICE CREAM FREEZER—F. Espel, S. F.
 274,180.—NIPPERS FOR PILE DRIVERS—Sam'l Haddock, Port Townsend, W. T.
 274,216.—COMBINED CUTTING, PUNCHING AND TIRE UPSETTING MACHINE—Harris Morse, Tutletown, Cal.
 274,217.—TWO WHEELED VEHICLE—Page & Raynor, San Bernardino, Cal.
 274,227.—SAWMILL CARRIAGE—Casper Schoch, Truckee, Cal.
 274,230.—BRACE FOR AXLE SPINDLES—R. R. Spedden, Astoria, Ogn.
 274,164.—STREET SWEEPING MACHINE—Geo. E. Woodbury, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through DEWEY & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

SAW MILL CARRIAGE.—Caspar Schoch, Truckee, Placer Co. No. 274,227. Dated March 20, 1883. This invention relates to new and useful improvements in traveling carriages, and automatic block-sets for saw mills. The improvements consist generally in a novel means for reciprocating the carriage and regulating at pleasure the length of its travel, and in a novel means for setting over after each cut the block or timber for a new cut. More especially the invention consists in a double rack upon the carriage, an adjustable spur gear adapted alternately to enlarge either directly or indirectly with each of said racks to advance or return them, a trip lever to which said spur gear is attached, and suitable catches engaging therewith, and stops to trip the catches, whereby, at the end of each stroke, the trip lever is vibrated to throw its spur gear in and out of engagement with the racks; further, in a pawl and ratchet mechanism operated by a swinging arm engaged indirectly by a weighted lever, and moved by its fall when released at the end of the return stroke of the carriage, whereby the block or timber holder is set over for a new cut; further, in the adjustability of certain of the catches and stops, whereby the stroke of the carriage may be lengthened or shortened. The object in this invention is to provide a ready and effective means for automatically reciprocating the carriage and setting over the block, and to dispense with the weight which is ordinarily used to return the carriage.

TWO-WHEELED VEHICLES.—Geo. W. Dalton, Tomales, Marin Co., Cal., assignor of two thirds to L. Guldayer and M. L. Murphy, of the same place. No. 274,183. Dated March 20, 1883. This invention is intended to overcome or prevent the unpleasant motion which is usually transmitted to the seat of two-wheeled vehicles by the joggling motion of the horse. There are certain details of construction to provide a vehicle which will be easy on both horse and driver. The axle and shafts are connected together by coiled springs, coiled in opposite direction. The body is made to hang down as low below the pivoted line as possible, giving it stability by force of gravity. This is done by clipping the side spring below the axle, by regulating the length of the iron shafts on which the body is hung to the ends of the spring bars, and by making a recess in the bottom of the body. The body has such stability in this position by force of gravity that the side springs, the front and rear springs, the shackles and the double coil springs, connecting each shaft with the axle, yield sufficiently to save the body, and prevent it from receiving any of the unpleasant motion it is desired to avoid. The shafts when connected with the axle by the coil springs, do not by their up and down motion cause the axle to rock as they would if they were immovably fastened to the axle; and the body is so connected with the axle by intermediate devices that by reason of the character of such devices, by reason of the position of the body, and by reason of the coil springs connecting shafts to axle, the up and down motion of the shafts is not communicated to the body.

STOP VALVE.—Thomas Hennessey, Oakland. No. 273,839. Dated March 13, 1883. This invention relates to certain improvements in valves for water-closets, basins, etc., and is more especially applicable to a device previously patented by the same inventor. It consists in certain details of construction, embracing an adjustment of the spindle to regulate the opening of the valve, a removable valve seat, and a valve seat chamber made independent of the

upper part of the cork, a spring to hold the valve to its seat, and a transparent chamber through which to inspect the interior.

TWO-WHEELED VEHICLE.—Henry D. Page and Wm. E. Raynor, San Bernardino, Cal. No. 274,217. Dated March 20, 1883. The essential feature of this invention is that the shafts or thills, instead of being one single, rigid piece throughout their length, are severed at a point forward of the wheels, and near, or even beyond, where the front part or edge of the foot rest should naturally come. The severed ends of the shaft overlap some little distance, and are connected by a hinge or knuckle joint formed in any suitable manner. The effect of this divided and hinged shaft is said to prevent the action of the forward part from being transmitted to the after part and thence through the axle to the body.

STEAM COOKER.—Anna Sherman, Alameda. No. 273,901. Dated March 13, 1883. This vessel for cooking purposes is especially adapted to be used in connection with a tea-kettle for producing the necessary heat. It consists of one or more containing vessels, fitted vertically, and having a central tube projecting from the bottom, and also extending up into the vessel, so as to form an annular chamber around the tube within the vessel. Around the lower part of the tube is a flange, which supports the device, and forms a cover for the kettle below. Perforated gratings are fitted to the annular space, and bridges across the top of the tube serve to support other vessels within the outer one.

RAILROAD SWITCH.—Wm. McCall, S. F. No. 273,865. Dated March 13, 1883. This invention relates to certain improvements on the construction and operation of street railroad switches. It consists in the formation of the switch rail, of an attachment to it, by which the passage of the car is made to change the position of the rail, so that a car will be directed upon either branch of the track. There is a double inclined, arrow-headed plate secured to the bottom of the rail at the point and running in a recess or channel, so that its inclined sides may be acted upon by an arrow from the passing car to force it to either side, and thus direct the car to the desired line of rails.

GAS MACHINE.—Garritt P. Judd, assignor to Henry Phillips, S. F. No. 273,852. Dated March 13, 1883. This invention relates to certain improvements in that class of apparatus in which gas is produced from naphtha, gasoline, and similar substances for heating or lighting. It consists in certain novel combinations of parts. The object is to thoroughly saturate the air in passing through the machine, with the vapor of the naphtha or gasoline, and then to remove the surplus liquid, so the resultant gas will burn readily. Foraminous chambers are placed in a receiver, and the air passes through them to the discharge pipe.

TWO-WHEELED VEHICLES.—John A. Bilz, Pleasanton, Alameda Co., Cal. No. 273,804. Dated March 13, 1883. The principal features covered by this patent are details of construction in the vehicle previously patented by the same inventor. In this the body is given great independence of the shafts. Not only are the springs and axle hinged to the shafts, but the body is hinged to the springs, thus giving to it a freedom which prevents it from having to follow the shafts in their up-and-down movement, thus making it an easy-riding vehicle.

THE *Silver State* says that J. H. MacMillan has received a dispatch from the Secretary of the Auburn M. and M. Co., at Chicago, requesting him to have the company's horses fed for work, as McAllester and Rogers leave Chicago Monday to start up the mill and mine.

THE only iron preparation that does not color the teeth, and will not cause headache or constipation, as other iron preparations will, is Brown's Iron Bitters.

Our Agents

OUR READERS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.
 G. W. McGREW—Santa Clara county.
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Complimentary Sample Copies of this paper are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage; and as far as practicable aid in circulating the journal and making its value more widely known to others and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year.

N. B.—Personal attention will be called to this (as well as other notices, at times) by turning down a leaf.

Gold Mines of San Luis Obispo.

On Monday last we were shown by Mr. Cerf, of Blochman & Co., a fine lot of several hundred dollars worth of gold dust from the mines of La Panza, in this county. In the receipts of bullion at San Francisco, as reported annually by various statisticians, the name of San Luis Obispo never appears, and thus in the report sent abroad one—as many others are—of our important interests, is neglected. Our people have been content in having our great butter and cheese interests reported, and our beans and corn and wheat and wool, and that this shall be classed simply as a good "cow county," but we will now protest against the farther ignoring of so important an interest as our gold mining is and may become. Throughout the San Jose mountains, between the Salinas and the San Juan rivers, gold is found, and where water is obtainable can be mined with profit. On La Panza, Navajo, Montezuma and other streams of that region, mining has been carried on quite extensively, and during the gold excitement of 1878-79 several hundred were engaged in washing for the precious metal. Numerous quartz veins have been found showing gold, but no machinery has been erected for crushing the ore. The gold is altogether obtained from the placers by cradle and sluice washing. The want of water is the chief obstacle to successful mining. The annual product, unless the drought prevents work, is about \$10,000. During the excitement above referred to the product reached \$50,000 to \$60,000 per annum. With such a bullion product we claim the attention of the San Francisco statisticians for a place in their reports. Put the county down as producing \$10,000 of gold dust annually; also some \$60,000 worth of chrome iron ore, and possessing immense deposits of quicksilver, copper, ore, gypsum, onyx, alabaster and asphaltum. If San Luis Obispo is a first-class "cow county," so is it able to take high rank in mining, as the mineral resources are of a wonderful rich and varied character.—*Tribune*.

News in Brief.

TWENTY-TWO ostriches, for the ostrich farm near Contra Costa station, Los Angeles county, have arrived safely at their destination.

At Winnemucca, Nevada, a woman serving a sentence in jail for whipping her husband, secured a divorce on the ground of extreme cruelty on his part.

SEVERAL localities at the foot of Mount Ararat have been destroyed by snow avalanches. It is stated that 150 persons have been killed and 100 injured.

THE *Shasta Courier*, a very good exchange and the first number of which was published on March 12th, 1882, has begun a new volume.

TWO THOUSAND infantry have been ordered to protect public buildings in London. The Coldstream Guards have been posted in the Parliament buildings and Buckingham Palace.

A SHOSHONE INDIAN stoned his young step-daughter to death near Belmont, Nev., last week. It is stated that the girl is the sixth victim of the murderous savage during the past five years.

THE answer of Prussia to the note of the Papal Secretary of State refuses to concede the demand relative to the education and appointment of priests. The negotiations thus far have been a failure.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANES, State Mineralogist.]

[CATALOGUE.]

4763. Grotesque Figure in Lead—Dug up at Olanche, Inyo county, California; without much doubt the handiwork of some noted lead smelter. Hon. J. M. Keeler.
 4761. U. al from the Sprout Vein (4 feet 6 inches thick)—Carbon river, Washington Ter. (see No. 1953). D. Morgan White.
 4762. Coal—Pacific Cumberland Vein, Carbon river, Washington Ter. D. Morgan White.
 4763. Coal, Henry Vein (13 feet thick)—Carbon river, Washington Ter. D. Morgan White.
 4764. Mica, Muscovite?—Tombstone district, Pima county, Arizona. E. Hain.
 4765. Silice, Gypsum—Near Gilroy, Santa Clara county, California.
 4766. Silver Ore—Lancashire mine, Garfield district, Esmeralda county, Nevada. Farrington and Moss.
 4767. Silver Ore—Bolton mine, Garfield district, Esmeralda county, Nevada. Farrington & Moss.
 4768. Silver Ore—Atherton mine, Garfield mining district, Esmeralda county, Nevada. Farrington & Moss.
 4769. Silver Ore—Manchester mine, Garfield mining district, Esmeralda county, Nevada. Farrington and Moss.
 4770. Scole's Flag Stone—Imported into the State, where there is plenty of equal quality that should be used.
 4771. Copper Ore—Illinois mine, Santa Fe district, Esmeralda county, Nevada; taken from a depth of 50 ft. S. E. Holcombe.
 4772. Copper Ore—Chicozola—Illinois mine, Santa Fe district, Esmeralda county, Nevada. S. E. Holcombe.
 4773. Copper Ore—containing Cuprite—Illinois mine, Santa Fe district, Esmeralda county, Nevada. S. E. Holcombe.
 4774. Copper Ore—Jersey Blue mine, Santa Fe district, Esmeralda county, Nevada. S. E. Holcombe.
 4775. Copper Ore—Royal mine, Santa Fe district, Esmeralda county, Nevada. S. E. Holcombe.
 4776. Copper Ore—Blue Light mine, Santa Fe district, Esmeralda county, Nevada. S. E. Holcombe.
 4777. Wall Rock, Foot Wall—Illinois mine, Santa Fe district, Esmeralda county, Nevada (see No. 4771). S. E. Holcombe.
 4778. Copper Ore—Sweet Vengeance mine, Santa Fe district, Esmeralda county, Nevada. S. E. Holcombe.

Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First St., a Rutherford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. Reference as to above can be had upon applying to this office.

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A great many people are asking what particular troubles BROWN'S IRON BITTERS is good for.

It will cure Heart Disease, Paralysis, Dropsy, Kidney Disease, Consumption, Dyspepsia, Rheumatism, Neuralgia, and all similar diseases.

Its wonderful curative power is simply because it purifies and enriches the blood, thus beginning at the foundation, and by building up the system, drives out all disease.

A Lady Cured of Rheumatism.

Baltimore, Md., May 7, 1880.
 My health was much shattered by Rheumatism when I commenced taking Brown's Iron Bitters, and I scarcely had strength enough to attend to my daily household duties. I am now using the third bottle and I am regaining strength daily, and I cheerfully recommend it to all.
 I cannot say too much in praise of it. Mrs. MARY E. BRASHEAR, 173 Prestman St.

Kidney Disease Cured.

Christiansburg, Va., 1881.
 Suffering from kidney disease, from which I could get no relief, I tried Brown's Iron Bitters, which cured me completely. A child of mine, recovering from scarlet fever, had no appetite and did not seem to be able to eat at all. I gave him Iron Bitters with the happiest results.
 J. KYLE MONTAGUE.

Heart Disease.

Vine St., Harrisburg, Pa. Dec. 2, 1881.
 After trying different physicians and many remedies for palpitation of the heart without receiving any benefit, I was advised to try Brown's Iron Bitters. I have used two bottles and never found anything that gave me so much relief.
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Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company.

San Francisco, March 21, 1883

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 17, of Five Cents (5c) per share, was declared, payable on Thursday, April 12, 1883. Transfer books closed on Monday, April 2, 1883, at 3 o'clock, P. M. This dividend is payable at the Farmers' Loan and Trust Company in New York, on all stock issued there, and at the office in this city on all stock issued here.

WM. WILLIS, Secretary.

OFFICE—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

NOTICE OF THE APPLICATION

—OF THE—

South Comstock Gold & Silver Mining Co.

For Dissolution and Disincorporation.

Notice is hereby given that the South Comstock Gold and Silver Mining Company has this day filed with the Clerk of the Superior Court, of the City and County of San Francisco, an application for Dissolution and Disincorporation, and all persons desiring to file objections to such application are hereby notified to file such objections within thirty days after the first publication of this Notice.

March 8, 1883. WILLIAM T. SESNON, Clerk.

Date of first publication,) O. Z. SOULIER,

March 16, 1883.) Deputy Clerk.

WHITMORE & McKEE, Attorneys for Petitioners.

H. H. BROMLEY,

Dealer in Leonard & Ellis Celebrated

TRADE MARK

VALVOLINE

STEAM CYLINDER AND MACHINE OILS,

The Best and Cheapest.

These Superior Oils cannot be purchased through dealer and are sold direct to consumer only by H. H. BROMLEY sole dealer in these goods.

Reference—Any first-class Engine or Machine Builder in America. Address, 43 Sacramento St., S. F.

Attention, Boiler-makers and Engineers!

Just Out! The Best Work of its Class Published!!

The Theoretical and Practical Boiler-maker.

By SAMUEL NICHOLS, Experienced Boiler-maker. Embarrassed with details of Geometry and Orthographic Projection as applied to Boilermaking; also to make, draw, design, and set out all kinds of Templet Work, as Ellipses, Cones, Truncated Cones, Oblique Cones, Frustums of Cones, Chimney Bottoms, Cylinders, Cylinder and Cone, Cylinder and Sphere, Cylinder connected with Curved Tube, Cylinder and Angular Tube, Cylinder with Spiral Staircase, Hip Roof and Cylinders, Tubes, Angular Tubes, T Tubes, Taper Tubes, Curved Tubes, Quadrant Tubes, Downtake Tubes, Flues, Spheres, Domes, etc., of every kind. Illustrated with 74 diagrams, including a full solution of all the problems relating to Boilermaking. The Cylinder, its sections, penetration, and development; Welding and Construction, Drilling, Punching, Riveting, Single and Double Riveted Lap and Butt Joints, with Single and Double Strips. Diameter, Spacing, Strength, and Pitch of Rivets; Strength and Pitch of Stays. On Locomotive, Marine, Cylindrical, and Egg-ended Boilers; Power of Boilers; Heating Surface of Boiler Tubes in square feet; the Lever Safety-Valve; the Cylinder, the Sphere, Area of Fire Grates; Quantity of Steam required for an Engine; Flat Surfaces, Boiler Explosions; Practical Notes on Steam; Properties of Saturated Steam; Proportion of Boilers; Bursting pressure of lap-jointed Wrought Iron Cylindrical Boilers; Collapsing pressure of Wrought Iron Cylindrical Tubes of varying thicknesses. Practical Rules, Instruction, and Memoranda for Boilermakers; Material for Boiler Construction; Welding, Strength, and Dimensions of Wrought Iron Boiler-plates and Iron Bars; Strength of Steel Plates, treatment of do.; Strength of Plates at different temperatures; Strength of Ropes and Chains; Properties of Metals; Weight of Wrought Iron Cylinders per lineal foot of any given diameter and thickness; Angle-iron Hoops; Diam., Cir., and Areas of Circles, with detailed calculations relating to Boiler Construction; to determine thickness of Boiler Heads, Cylinder Covers, etc. Mensuration as applied to Boiler-making; Fuel Valves, Construction of Fuel, Evaporation of Water; Setting Boilers, Incurstion, Boiler Scale Preventives, 35 kinds; Decimal equivalents, Weight of Water; Expansion of Water; Squares, Cubes, and Roots; Fusing Points of Metals; Conducing Powers of Metals; Useful Definitions. Reference Tables (83 pages) for Boiler-makers, Engineers, Smiths, etc. 1 vol. 12mo, extra cloth. Mailed post free to any address on receipt of \$2.50. Sent for 128 pages illustrated Catalogue of 3000 Standard Books on every subject. Agents wanted. National Book Company, 73 Beekman Street, New York.

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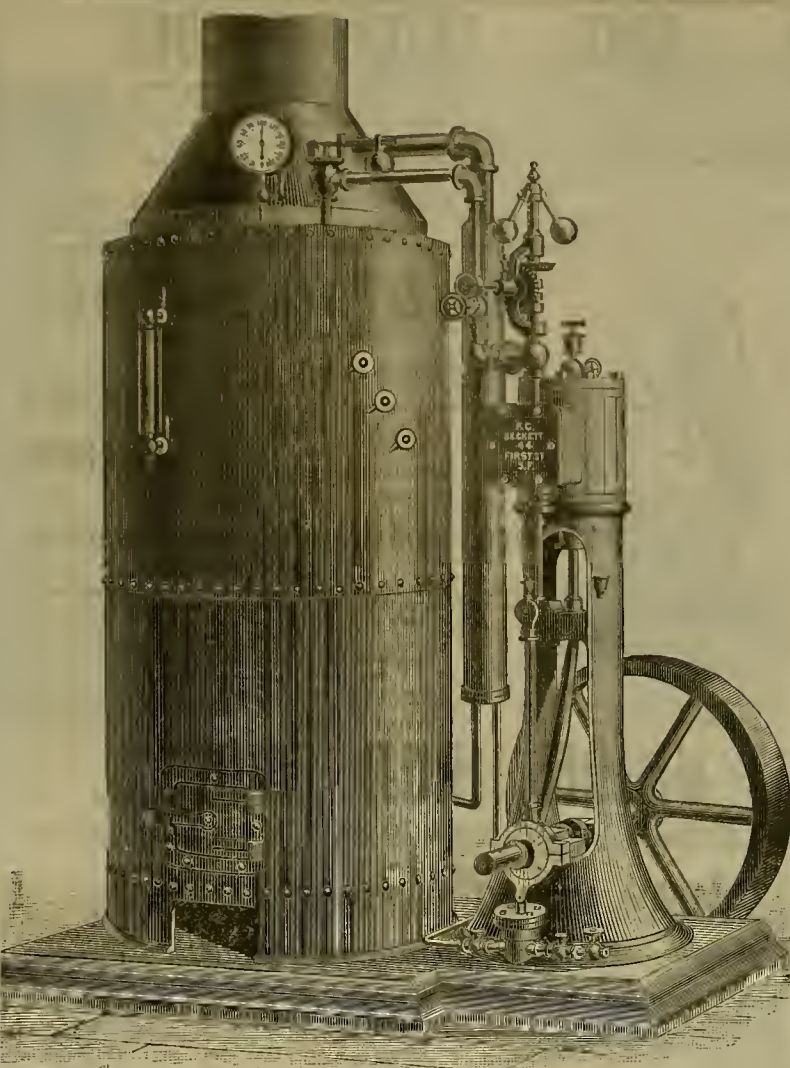
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Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

Foreign Patents.

In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

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Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

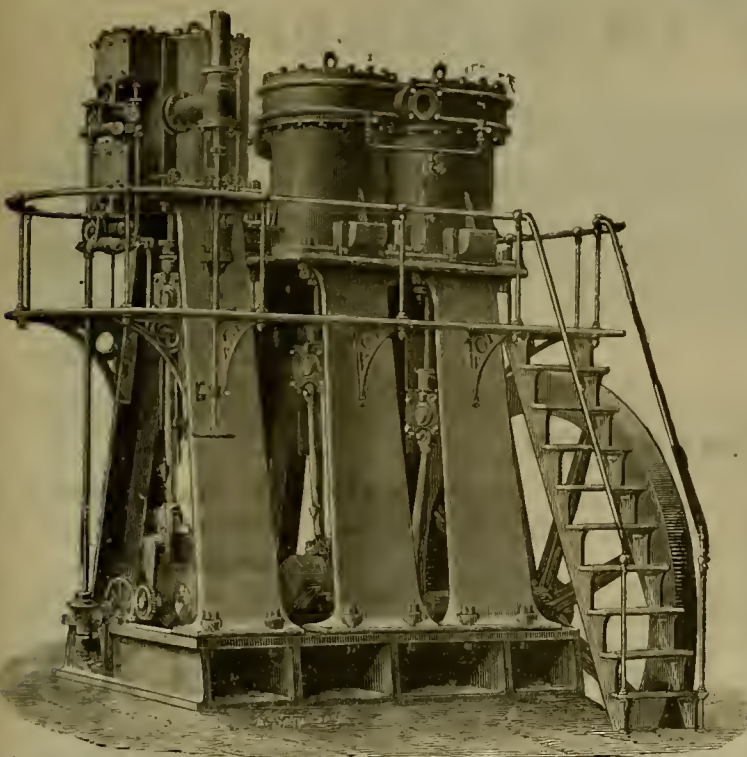
Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

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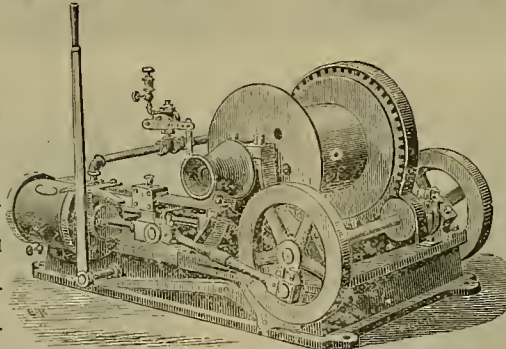
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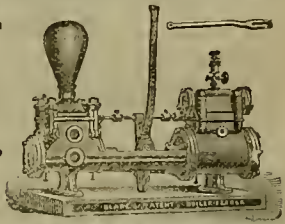
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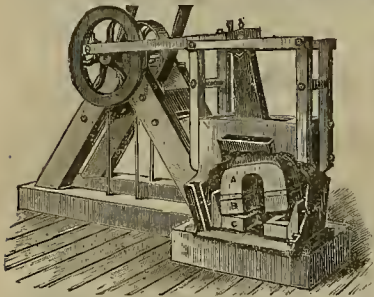
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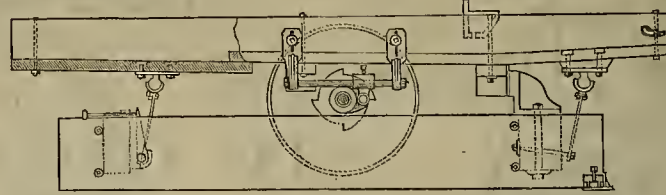
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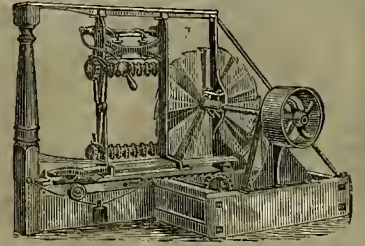
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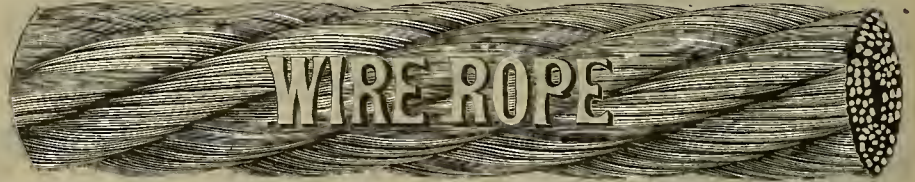
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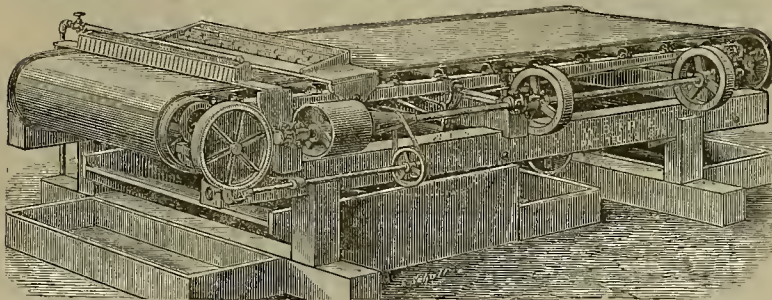
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Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal.

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To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machines infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machines, for stakes of \$1,000.

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Nov. 6, 1882.

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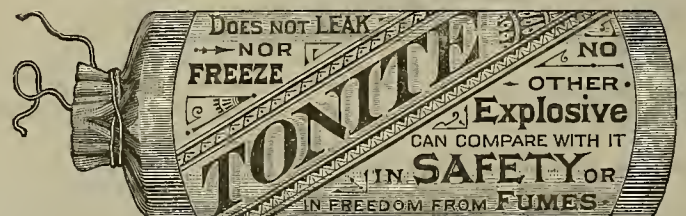
CHICAGO, ILLINOIS,Nos. 152 and 154 Lake Street.
And 40 Franklin Street.**ST. LOUIS, MISSOURI,**

No. 200 North Third Street

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Nos. 811 to 819 North Second Street

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TONITE POWDER CO.,

No. 327 Pine Street,

SAN FRANCISCO.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 7, 1883.

VOLUME XLVI
Number 14.

Exhaust Fans and Pressure Blowers.

About a year ago, Wright D. Smith, superintendent of a planing mill at Detroit, devised a new form of fan, which speedily attracted the attention of mill men by its wonderful performances. The planing mill of M. C. Huyett & Co. was recognized as the model mill of Michigan, when erected in 1881. In it one of these fans of 400 square inch inlet has been in constant use, driven by a four-inch belt on a seven-inch pulley. It blows the surplus shavings 600 feet under five railroad tracks, and up into a storage and sales house.

Fig. 1 of the accompanying engravings shows the fan with one side removed. It will be seen that the radical improvements spoken of are two in number, and consist of a peculiar arrangement of the fan-blades, and the use of double cut-off, or discharge points. The construction of the case, or shell, is entirely different from anything heretofore made; it can be taken apart—both wheels, shaft and pulley removed in five minutes by any one who can handle a monkey-wrench. The spiders, or arms to which the fan-blades are attached, are set so that those next to the inlet side of the fan travel ahead of their fellow, giving a peculiar "skew" to the fan-blades, which arrangement forms one of the especial features of the fan, and is the subject of a special claim in the inventor's patent. The advantages of the double cut-off are as follows: The material passing into the fan, between the center and left side of the inlet, takes an upward direction, and the compression of the blades is cut off at their right hand upper corner of the inlet box, the material and air passing out of the fan case under the partition shown in the figure where the side is removed. Material passing in between the center and right side of the inlet takes a downward direction, and the compression is cut off at the left lower corner of the inlet, the compression being absolutely cut off twice in each revolution of the wheel. In this manner it is perfectly feasible, by suitably arranging the pipes, to blow sawdust and shavings through the same fan, and send them in different directions, unmixed, a feat that would of course be impossible of accomplishment with one cut-off and outlet. The blast wheel is about one third less in width and diameter than any other fan of the same capacity. For example: A fan of 200 inches inlet and 234 inches discharge, has a blast wheel 15½ inches in diameter and 8 inches wide, with a steel shaft 1½ inches in diameter by 30 inches in length.

The makers declare their ability to substantiate the extraordinary claim that the Smith fan requires only one half the power to operate it needed by any other machine of the same capacity, and assert that it commends itself to users upon the following grounds:

First—It has a direct suction inlet, requiring no elbow to connect it with the main suction pipe, thereby maintaining a powerful and unobstructed suction.

Second—It is two fans propelled by one pulley and a shaft, each separate and distinct from the other, and they may be piped to the exhaust room in one or two pipes, as may be desired.

Third—It is driven with one belt and pulley, from the center of the shaft, with the boxes close on either side the pulley, thus giving the greatest strength to all the running parts and avoiding the spring and vibration common to

other fans with long shafts and overhanging pulleys.

Fourth—The two cut-off points, each discharging a volume of air one third the diameter and the whole width of the fan, gives an outlet of more than two thirds the diameter and the whole of the width.

The economical point, or location of the cut-off, is recognized by experts to be one third the diameter of the wheel. Ordinary fans have but one cut-off, consequently, after the blade

Manufacture of Borax.

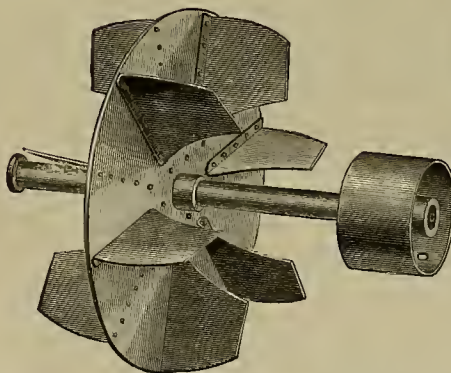
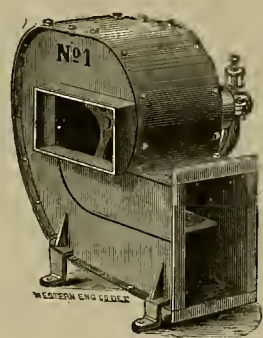
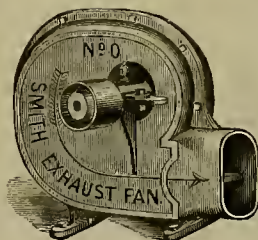
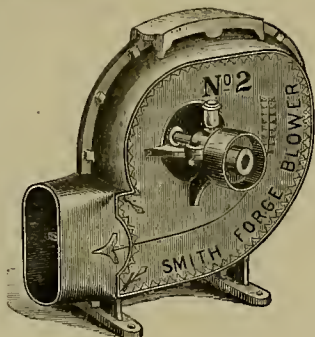
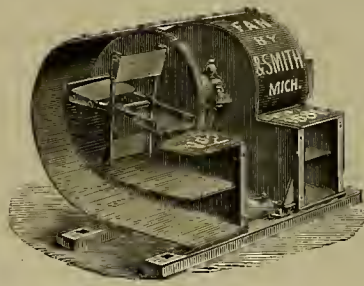
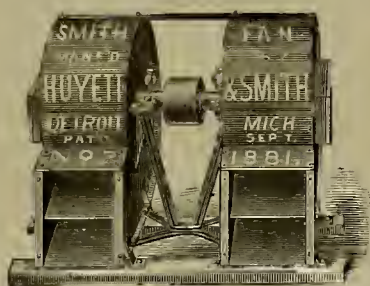
In manufacturing the borax of commerce at the great borate deposits on this coast considerable expense is entailed in the purchase and transportation of the ordinary hydrated sulphuric acid. In the manufacture of sulphuric acid special preparation and apparatus are necessary. It is well known that to make acid upon a small scale is very unprofitable, and to engage in its manufacture with sure prospects

to set free the boracic acid more rapidly and effectively, by the employment of a strong reagent, and to cheapen the cost of operation by providing a means for making this reagent directly and in close connection with the substance to be acted upon, whereby the necessity of two operations—to-wit, the separate and expensive manufacture of the sulphuric acid, and its transportation as such to the field of operation—is avoided. The process consists in a means of forming nitrous and sulphurous vapors, and admitting air thereto, and in a means for forcing said vapors into a tank containing a suspension or solution of the borate.

A tank is provided for the solution, and an ordinary furnace is used for containing sulphur to undergo combustion. In this furnace is a pot containing any suitable nitrate. The furnace has a front aperture with a sliding door, so as to admit more or less air. A pipe connects the furnace with the tank, said pipe extending down in the tank nearly to its bottom. A steam boiler is provided, from which is a pipe extending into the other pipe, which connects the furnace and tank so that pressure of steam will act as an injector and carry the furnace vapors into the borate solution in the tank.

The process is as follows: In the tank is placed water and the borate introduced. If borate of soda, a solution is formed; if borate of lime or magnesia, they are held in suspension. In the furnace is placed sulphur, and it is ignited. The pot rests over the sulphur and contains any suitable nitrate—such as nitrate of soda—which is commonly used in the manufacture of sulphuric acid. In order to start and assist the operation, Mr. Robertson places in the pot with the nitrate a small quantity of hydrated sulphuric acid. In this furnace are formed, as is well known, the nascent gases of sulphuric acid—namely, the nitrous and sulphurous vapors—which, together with the air drawn in through the front of the aperture, contrive to produce the result. The steam from the boiler passing through the pipe acts as an injector, and forces or carries with it these vapors through the furnace pipe into the borate solution or suspension in the tank.

The effect of this is that sulphuric acid is formed and introduced directly to the solution. It takes up the soda, lime, magnesia, or whatever may be the base of the borate, and precipitate it as a sulphate. The boracic acid (B_2O_3) is set free, and the solution may be drawn off, where it crystallizes in a free state in the proper crystallizing pans. The effect of the acid in the borate solution is the same whether this latter be cold or hot—that is, the reaction takes place, and the boracic acid is liberated, so that at the beginning of the operation, when the solution is cold, the operation is taking place; but before the process is complete the solution warms up under the steam, so that when ready to be drawn off it is hot enough to provide for the proper crystallization of the boracic acid. Thus no time is lost and the means will conduce to the end. This treatment with sulphuric acid formed directly and in connection with the borate solution, the inventor deems preferable to the treatment with sulphurous acid gas (SO_2) because he attains a stronger and more effective reagent with as little trouble. The great advantage possessed by the process over that in which the hydrated sulphuric acid of commerce is used is that it is more economical both in trouble and expense. Of course Mr. Robertson is aware that heretofore borates in solution have been treated with sulphurous acid, and does not broadly claim this, but confines himself to the details described.



HUYETT & SMITH'S EXHAUST FANS AND PRESSURE BLOWERS.

has passed this point, it meets resistance in compressed air until it has passed entirely around its circuit.

In less than a year after the introduction of the machine, the manufacturers were compelled to erect extensive machine shops to enable them to supply the demand, and their fans have been sent all over the country. Further information concerning them may be obtained by addressing the Berry & Place Machine Co., 8 California street, in this city.

CAPT. KANS maintains that there is danger of the bulk of the water of the Mississippi river finding its way to the gulf through the Atchafalaya outlet, and, in that event, New Orleans would be left on the banks of a dead lagoon.

of success an expensive plant is necessary. For this reason it is made in but few localities, and it therefore becomes necessary to purchase it and undertake the extreme risk and high rates of transportation to the place or places where the borates are usually found. Wm. B. Robertson, Jr., of this city, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a simple and inexpensive means of forming its nascent gases directly and upon the spot; and also a process for treating the borates with them. The process is such as to avoid expense; and one advantage is that the waste is avoided attending the employment of the sulphuric acid of commerce when poured directly into the borate solution.

The object of the process is twofold, namely:

The New Tariff on Metals.

Iron ore, including manganiferous iron ore, also the dross or residuum from burnt pyrites, seventy-five cents per ton. Sulphur ore, as pyrites or sulphuret of iron in its natural state, containing not more than three and one half per centum of copper, seventy-five cents per ton: Provided, that ore containing more than two per centum of copper shall pay, in addition thereto, two and one half cents per pound for the copper contained therein.

Iron in pigs, iron kentledge, spiegeleisen, wrought and cast scrap iron, and cast steel, three tenths of one per cent per pound; but nothing shall be deemed scrap iron or scrap steel except waste or refuse iron or steel that has been in actual use, and is fit only to be remanufactured.

Iron railway bars, weighing more than twenty-five pounds to the yard, seven tenths of one cent per pound.

Steel railway bars and railway bars made in part of steel, weighing more than twenty-five pounds to the yard, seventeen dollars per ton.

Bar iron, rolled or hammered, comprising flats not less than one inch wide, nor less than three eighths of an inch thick, eight tenths of one cent per pound; comprising round iron not less than three fourths of one inch in diameter, and square iron not less than three fourths of one inch square, one cent per pound; comprising flats less than one inch wide, or less than three eighths of one inch thick; round iron less than three fourths of one inch and not less than seven sixteenths of one inch in diameter, and square iron less than three-fourths of one inch square, one and one tenth of one cent per pound: Provided, that all iron in slabs, blooms, loops, or other forms, less finished than iron in bars, and more advanced than pig iron, except castings, shall be rated as iron in bars, and pay duty accordingly; and none of the above iron shall pay a less rate of duty than thirty-five per centum ad valorem; Provided further, that all iron bars, blooms, billets, or sizes or shapes of any kind in the manufacture of which charcoal is used as fuel, shall be subject to a duty of twenty-two dollars per ton.

Iron or steel T rails, weighing not over twenty-five pounds to the yard, nine tenths of one cent per pound; iron or steel flat rails, punched, eight tenths of one cent per pound.

Round iron, in coils or rods, less than seven sixteenths of one inch in diameter, and bars or shapes of rolled iron not specially enumerated or provided for in this Act, one and two tenths of one cent per pound.

Boiler, or other plate iron, sheared or un-sheared, skelp iron, sheared or rolled in grooves, one and one fourth cents per pound; sheet iron, common or black, thinner than one inch and one half, and not thinner than number twenty wire gauge, one and one tenth of one cent per pound; thinner than number twenty wire gauge, and not thinner than number twenty-five wire gauge, one and two tenths of one cent per pound; thinner than number twenty-five wire gauge, and not thinner than number twenty-nine wire gauge, one and five tenths of one cent per pound; thinner than number twenty wire gauge, and all iron commercially known as common or black taggers' iron, whether put up in boxes or bundles or not, thirty per centum ad valorem; and provided, that on all such iron and steel sheets or plates aforesaid, excepting on what are known commercially as tin plates,terne plates, and taggers' tin, and hereafter provided for, when galvanized or coated with ink or spelter, or other metals, or any alloy of those metals, three fourths of one cent per pound additional.

Polished, planished or glanced sheet iron or sheet steel, by whatever name designated, two and one half cents per pound; *Provided*, That plate, or sheet iron, or taggers' iron, by whatever name designated, other than the polished, planished or glanced herein provided for, which has been pickled, or cleaned by acid, or by any other material or process, and which is cold rolled, shall pay one quarter cent per pound more duty than the corresponding gauges of common, or black sheet, or taggers' iron.

Iron or steel sheets, or plates, or taggers' iron, coated with tin or lead, or with a mixture of which these metals is a component part, by the dipping or any other process, and commercially known as tin plates, terne plates, and taggers' tin, one cent per pound; corrugated, or crimped sheet iron or steel, one and four tenths of one cent per pound.

Hoop, or band, or scroll, or other iron, eight inches or less in width, and not thinner than number ten wire gauge, one cent per pound; thinner than number ten wire gauge, and not thinner than number twenty wire gauge, one and two tenths of one cent per pound; thinner than number twenty wire gauge, one and four tenths of one cent per pound: *Provided*, that all articles not specially enumerated or provided for in this Act, whether wholly or partly manufactured, made from sheet, plate, hoop, band, or scroll iron herein provided for, or of which such sheet, plate, hoop, band, or scroll iron shall be the material of chief value, shall pay one fourth of one cent per pound more duty than that imposed on the iron on which they are made, or which shall be such material of chief value.

Iron and steel cotton ties, or hoops for baling purposes, not thinner than number twenty wire gauge, thirty-five per centum ad valorem.

Cast iron pipe of every description, one cent per pound.

Cast iron vessels, plates, stove plates, and irons, sadirons, tailors' irons, hatters' irons, and

castings of iron, not specially enumerated or provided for in this Act, one and one quarter of one cent per pound.

Cut nails and spikes of iron or steel, one and one quarter of one cent per pound.

Cut tacks, brads, or sprigs, not exceeding sixteen ounces to the thousand, two and one half cents per thousand: exceeding sixteen ounces to the thousand, three cents per pound.

Iron or steel railway fish plates, or splice bars, one and one fourth of one cent per pound.

Malleable iron castings, not especially enumerated or provided for in this Act, two cents per pound.

Wrought iron or steel spikes, nuts or washers, and horse, mule or ox shoes, two cents per pound.

Anvils, anchors, or parts thereof, mill-stones and mill-crank of wrought iron, and wrought iron, and wrought iron for ships, and forgings of iron and steel for vessels, steam engines and locomotives, or parts thereof, weighing each twenty-five pounds or more, two cents per pound.

Iron or steel rivets, bolts, with or without threads or nuts, or bolt blanks, and finished hinges or hinge blanks, two and one half of one cent per pound.

Iron or steel blacksmiths' hammers and sledges, track tools, wedges and crowbars, two and one half of one cent per pound.

Iron or steel axles, parts thereof, axle bars, axle blanks, or forgings for axles, without reference to the stage or state of manufacture, two and one half of one cent per pound.

Forging of iron and steel or forged iron, of whatever shape or in whatever stage of manufacture, not specially enumerated or provided for in this Act, two and one half cents per pound.

Horseshoe nails, hob-nails and wire nails, and all other wrought iron or steel nails, not specially enumerated or provided for in this Act, four cents per pound.

Boiler tubes, or flues, or stays, of wrought iron or steel, three cents per pound.

Other wrought iron or steel tubes or pipes, two and one quarter cents per pound.

Chain or chains of all kinds, made of iron or steel, not less than three fourths of one inch in diameter, one and three quarters cents per pound; less than three fourths of an inch and not less than three eighths of an inch in diameter, two cents per pound; less than three eighths of one inch in diameter, two and one half cents per pound.

Crosscut saws, eight cents per linear foot.

Mill, pit and drag saws, not over nine inches wide, ten cents per linear foot; over nine inches wide, fifteen cents per linear foot.

Circular saws, thirty cents per ad valorem.

Hand, back, and all other saws, not specially enumerated or provided for in this Act, forty per centum ad valorem.

Files, file blanks, rasps, and floats of all cuts and kinds, four inches in length and under, thirty-five cents per dozen; over four inches in length and under nine inches, seventy-five cents per dozen; nine inches in length and under fourteen inches, one dollar and fifty cents per dozen, fourteen inches in length and over, two dollars and fifty cents per dozen.

Steel ingots, cogged ingots, blooms, and slabs, by whatever process made, die blocks or blanks, billets and bars, bands, hoops, strips, and sheets of all gauges and widths, plates of all thicknesses and widths, steamer, crank, and other shafts, wrist or crank pins, connecting rods and piston rods, pressed, sheared, or stamped shapes, or blanks of sheet or plate steel, or combination of steel and iron, punched or not punched, hammerblonds or swaged steel, gun molds not in bars, alloys used as substitutes for steel tools, all descriptions and shapes of dry sand loom, or iron molded steel castings, all of the above classes of steel not otherwise specially provided for in this Act valued at four cents a pound or less, forty-five per centum ad valorem; above four cents a pound and not above seven cents per pound, two cents per pound; valued at seven cents and not above ten cents per pound, two and three fourths cents per pound; valued at above ten cents per pound, three and one fourth cents per pound. *Provided*, that on iron or steel bars, rods, strips or steel sheets, of whatever shape, and on all iron or steel bars of irregular shape or section, cold rolled, cold hammered, or polished in any way in addition to the ordinary process of hot rolling or hammering, there shall be paid one fourth cent per pound in addition to the rates provided in this Act, and on steel circular saw plates there shall be paid one cent per pound in addition to the rates provided for in this Act.

Iron or steel beams, girders, joists, angles, channels, car-truck channels, tees, columns and posts, or parts or sections of columns or posts, deck and bulb beams, and building forms, together with all other structural shapes of iron or steel, one and one fourth of one cent per pound.

Steel wheels, and steel wired wheels for railway purposes, whether wholly or partly manufactured, two and one half of one cent per pound; iron or steel ingots, cogged ingots, blooms, or blanks for the same, without regard to the degree of manufacture, two cents per pound.

Iron or steel rivet, screw, nail and fence wire rods, round, in coils and loops, not lighter than number twenty wire gauge, valued at three and one half cents or less per pound, six tenths of one cent per pound. Iron or steel, flat, with longitudinal ribs, for the manu-

facture of fencing, six tenths of one cent per pound.

Screws, commonly called wood screws, two inches or over in length, six cents per pound; one inch, and less than two inches in length, eight cents per pound; over one half inch and less than one inch in length, ten cents per pound; one half inch and less in length, twelve cents per pound.

Iron or steel wire, smaller than number five, and not smaller than number ten wire gauge, one and one half cents per pound; smaller than number ten, and not smaller than number sixteen wire gauge, two cents per pound; smaller than number sixteen, and not smaller than number twenty-six wire gauge, two and one half cents per pound; smaller than number twenty-six wire gauge, three cents per pound.

Provided, That iron or steel wire covered with cotton, silk, or other material, and wire commonly known as crinoline, corset and hat wire, shall pay four cents per pound in addition to the foregoing rates. And provided further, That no article made from iron or steel wire, or of which iron or steel wire is a component part of chief value, shall bear a less rate of duty than the iron or steel wire from which it is made, either wholly or in part; and provided further, That iron or steel wire cloths, and iron or steel wire nettings, made in meshes, or any form, shall pay a duty equal in amount to that imposed on iron or steel wire of the same gauge, and two cents per pound in addition thereto. There shall be paid on galvanized iron or steel wire (except fence wire), one half of one cent per pound in addition to the rate imposed on the wire of which it is made. On iron wire rope and wire strand, one cent per pound in addition to the rates imposed on the wire of which it is made. On steel wire rope and wire strand, two cents per pound in addition to the rates imposed on the wire of which it is made.

Steel not specially enumerated or provided for in this Act, forty-five per centum ad valorem. *Provided*, That all metal produced from iron or its ores, which is cast and malleable, of whatever description or form, without regard to the percentage of carbon contained therein, whether produced by cementation, or converted, cast, or made from iron or its ores, by the crucible, Bessemer, pneumatic, Thomas-Gilchrist, basic, Siemens-Martin, or open-hearth process, or by the equivalent of either, or by the combination of two or more of the processes, or their equivalents, or by any fusion or other process which produces from iron or its ores a metal either granular or fibrous in structure, which is cast or malleable, excepting what is known as malleable iron castings, shall be classed and denominated as steel.

No allowance or reduction of duties for partial loss or damage, in consequence of rust or of discoloration, shall be made upon any description of iron or steel, or upon any partly manufactured article of iron or steel, or upon any manufacture of iron and steel.

Argentine, albata or German silver, manufactured, twenty-five per centum ad valorem.

Copper, imported in the form of ores, two and one half cents on each pound of fine copper contained therein; regulus of and black or coarse copper cement, three and one half cents on each pound of fine copper contained therein; old copper fit only for re-manufacture, chippings from new copper, and all composition metal of which copper is a component material of chief value not specially enumerated or provided for in this Act, three cents per pound; copper in plates, bars, ingots, Chili or other pigs, and in other forms not manufactured, or enumerated in this Act, four cents per pound; in rolled plates, called brazier's copper, sheets, rods, pipes and copper bottoms, and all manufactures of copper, or of which copper shall be a component of chief value, not specially enumerated or provided for in this Act, thirty-five per centum ad valorem.

Brass, in bars or pig, old brass, and clippings from brass or Dutch metal, one and one half cents per pound.

Lead ore, and lead dross, one and one half cents per pound.

Lead, in pigs and bars, molten and old refused lead run into blocks and bars, and old scrap lead, fit only to be remanufactured, two cents per pound.

Lead in sheets, pipes or shot, three cents per pound.

Nickel in ore, matte, or other crude form, not ready for consumption in the arts, fifteen cents per pound on the nickel contained therein.

Nickel, nickel oxides, alloy of any kind in which nickel is the element of chief value, fifteen cents per pound.

Zinc, spelter, or tutenag, in blocks or pigs, and old, worn-out zinc, fit only to be remanufactured, one and one half cents per pound; zinc, spelter, or tutenag in sheets, two and one half cents per pound.

Sheeting, or yellow metal, not wholly of copper, nor wholly nor in part of iron, mangle, in sheets, forty-eight inches long and fourteen inches wide, and weighing from fourteen to thirty-four ounces per square foot, thirty-five per centum ad valorem.

Antimony as a regulus or metal, ten per centum ad valorem.

Bronze powder, fifteen per centum ad valorem.

Cutlery not specially provided for in this Act, thirty-five per centum ad valorem.

Dutch or bronze metal, in leaf, ten per centum ad valorem.

Steel plates, engraved, stereotyped plates, and new type, twenty-five per centum ad valorem.

Gold leaf, one dollar and fifty cents per package of 500 leaves.

Hollow ware, coated, glazed or tinned three cents per pound.

Muskets, rifles and other firearms, not specially enumerated or provided for in this Act, twenty-five per centum ad valorem.

All sporting breech-loading shot-guns, and pistols of all kinds, thirty-five per centum ad valorem.

Forged shot-gun barrels, rough-bored, ten per centum ad valorem.

Needles, for knitting or sewing machines, thirty-five per centum ad valorem.

Needles, sewing, darning, knitting, and all others not specially enumerated or provided for in this Act, twenty-five per centum ad valorem.

Pen-knives, pocket knives, and all knives and razors, fifty per centum ad valorem; swords, sword-blades, and side-arms, thirty-five per centum ad valorem.

Pens, metallic, twelve cents per gross; pen-holder tips and pen-holders, or parts thereof, thirty per centum ad valorem.

Pins, solid heads or other, thirty per centum ad valorem.

Britannia ware, and plated and gilt articles and wares of all kinds, thirty-five per centum ad valorem.

Quicksilver, ten per centum ad valorem.

Silver lead, seventy-five cents per package of five hundred leaves.

Type metal, twenty per centum ad valorem.

Chromate of iron, or chromic ore, fifteen per centum ad valorem.

Mineral substances in a crude state, and metals unwrought, not specially enumerated or provided for in this Act, twenty per centum ad valorem.

Manufactures, articles or wares not specially enumerated or provided for in this Act, composed wholly or in part of iron, steel, copper, lead, nickel, pewter, tin, zinc, gold, silver, platinum, or any other metal, and whether partly or wholly manufactured, forty-five per centum ad valorem.

A Great Ditch Enterprise.

The New Ditch of the South Yuba Co.—Reservoir Building.

A reporter of the Nevada *Transcript* has been along the line of the new ditch, and has this to say about it:

J. E. Brown and a *Transcript* reporter went on a trip of inspection over the lower portion of the new Town Talk ditch. It is a model piece of work from one end to another, the grades being faultless and all the work, both trenching and fluming, of the very best kind. It is probably the most substantially constructed canal owned by the South Yuba Company, and has a capacity of 2,000 inches. The details of the work have been carried out under the supervision of John Spaulding, the company's very efficient Superintendent. By the building of this ditch thousands of acres of rich land, beginning on the slopes of Banner Mountain and extending down into the Allison Ranch part of the county, much of which has heretofore been practically valueless because of lack of water, will from this time forward be highly productive in fruit, vegetables, corn and hay. The line of the ditch is upon the summit of the ridge most of the way, and along both sides the ranches will be benefited beyond measure. The principal object in building the ditch was, however, to supply the demand in the portions of this and Grass Valley townships lying in proximity to its course for a cheap and reliable motive power for mining and prospecting purposes, as has been mentioned in these columns heretofore. It will advance the mining, agricultural and horticultural prosperity of this part of the county more materially than any other step that could have been devised, and will begin at once to redound to the profit of the projectors.

At Pingree's ranch the company now has fifteen teams and eighty men at work building its main distributing reservoir for Grass Valley district. It is to have an area of seven acres and a depth of twenty-one feet. The site selected is a depression on the backbone of the ridge, at the lowest side of which is being constructed an earthen embankment seventy feet wide at its base, twenty-one feet high, sloping to a width of twelve feet on top, and about 700 feet in length. The work at this reservoir is being done under the supervision of Wm. Mcservey, who is to have charge of that section of the line when it is completed. The lake is to be stocked with fish, a boat will be launched, and the surroundings are naturally very picturesque. It is some distance from any regular line of travel, and will by another year prove a delightful summer resort.

A mile nearer to Grass Valley is being made another and similar reservoir for the especial use of the Idaho Mining Company. From this reservoir to the mine the water will be conducted by iron pipes, and after being used for power at that mine, will be allowed to flow on down towards Allison Ranch where it will be disposed of for irrigation purposes.

THE Mountain Chief property, located near the Ontario at Park City, is now involved in a contest in the courts for the purpose of determining title.

A New strike is reported in the Apex mine, Park City. It is reported the body of ore is large and of good quality.

TRAVEL is beginning to set in toward Wood River at a lively rate.

MECHANICAL PROGRESS.

Thoughts on Belts.

A noted feature in many manufactories is unnecessary tension of belts, which not only shortens the life of them, but absorbs considerable power that should be utilized in doing useful work; and the resultant of the power wasted is the heating of journals and melting of habbitt metal. Moreover, no shaft can remain long in line where belts are run needlessly tight, and the extra coal burned is of no little importance, besides wear and tear of the plant, and delays caused by broken belts, etc.

It will be much more effectual and satisfactory to decrease the tension of the belts and increase the diameters of the pulleys, or width of belts, rather than run them too tight. More than one instance could be chronicled where as high as fifteen per cent. of the power used was consumed in overcoming friction caused by tight belts.

The driven pulley on line shafts should be placed as near the center of the work as possible. When it is not convenient to locate the driven pulley at or near the center of the work, it is desirable in all cases to have bearings both sides of the pulley, and in close proximity to it, to receive the pull of the belt. Narrow belts are more usually run extra tight than wide ones, owing to the extra duty required of them, in proportion to their strength, than larger ones.

The experiments of both scientific and practical men differ so widely, and the results are so unsatisfactory that an ordinary individual can gain but little knowledge from them which would be of utility, consequently he has to use his judgment, and depend upon common sense and the circumstances existing, in producing details and dimensions to meet his requirements. There are so many circumstances and conditions that influence the driving power, and satisfactory working of the belts that no infallible rules can be laid down, nor advice given, which would give the same results or efficiency in all cases. Leather belts should not be used in damp places, but if used should be kept well oiled, and the laps should be sewed instead of riveted to give the best results.

Increasing the tension of belts by the use of tighteners (so-called) should be avoided if possible, as they conduce to ruin the belt, and require care, oil, power and repairs.—*Mechanical Engineer.*

ECONOMICAL GAS GENERATORS AND ENGINES.

The power for the new gas engine works of Messrs. Crossley Bros., Limited, (Eng.) is to be obtained from gas engines driven with generator gas made by the Dowson process. Nearly all the plant for 150-horse power has been put down, consisting of three producers connected with three scrubbers for washing the gas, and a holder for compensating the supply and regulating the pressure. Messrs. Crossley have had a 30-horse power engine working regularly with this gas during about two months, under test conditions. It has been found that the generators took forty-five minutes in firing up, and afterward the fuel consumption per 1,000 cubic feet of gas passed into the holder was 13.2 pounds. The *Journal of Gas Lighting* says that the consumption of the engine was at the rate of 109 cubic feet per indicated horse power, representing a fuel consumption of 1.4 pounds per horse power per hour. The coal used is small sized anthracite, costing 3s. 6d. per ton in truck at the pit. The wages for the fireman for the gas generators are about the same as for a set of steam boilers. Thus the economy of the system consists chiefly in the low rate of fuel consumption. This consideration is important, in connection with the fact that the engines are small; for it will enable different lines of shafting to be driven by separate engines as economically with regard to fuel as by a single large engine of the best construction. Any department may therefore be kept at work independently of others. Against this advantage must be set off, in the case of manufacturers who have to purchase their gas engines, the high price of these machines and the added cost of the gas producing plant.—*Scientific American.*

SOME CAUSES OF BOILER CORROSION.—Herr Keil names two causes of the internal and external corrosion of boiler plates, which, he observes, have hitherto been but little studied. These are the chemical composition of the metal composing the plates and the influence of the vibrations of temperature. A highly carburized plate, approaching nearly to steel, will become oxidized less readily than one containing very little carbon. On the other hand, phosphorus, sulphur, manganese, silicon, and magnesium favor oxidation, and consequently corrosion; and, as these substances are not uniformly distributed over the metal, some parts of a plate are attacked in preference to others. With regard to the second cause, certain portions of the boiler are, more than others, subject to rapid changes of temperature. Thus, the fluctuations of the water level often cause a portion of the plates to be left unprotected by the water on one side, while on the other it is always exposed to the action of the fire. Consequently corrosions are often noticed near the water line which are not met with either above or below it. The same thing is observed along a seam of rivets where there are two, and sometimes three, thicknesses of plate, which form an obstacle to the uniform absorption of heat.

A NEW SYSTEM OF MELTING IRON.—A new system of melting iron, and at the same time incorporating in it scrap, wrought iron, etc., has been invented by Herr Bruegger, a well known engineer, who has built one furnace at the Michelbacher Huette, at Michelbach, Prussia, and another at the works of Julius Meyer & Co., at Nordon. The cupola is supplied with blast through two sets of tuyeres, one above the other, there being eighteen in each set. The tuyeres or ports, which have the form of a vertical slot, are directly connected with a circular tyre ring. The particular feature of the cupola is that the bottom is a slightly inverted arch, which is pierced by two openings through which both blasts, or rather imperfectly consumed gases of combustion, and the fluid iron can flow. Below is a small chamber in which the iron collects. It is heated by the gases forced downward from the cupola above, which are supplied with the necessary air for combustion by a special tyre leading from the main blast pipe. The chamber at the same time serves for preheating scrap, etc., which need only be pushed into the bath for dissolving it. Of course it is well known that considerable quantities of scrap can be used by directly charging any ordinary cupola; but it is claimed that in this case there are economy of fuel and a greater facility for making sharp, strong castings and a purer metal. The best iron for this purpose is said to be inferior pig, like No. 3 Middleborough, holding considerable silicon and little manganese. To it, from forty to fifty per cent. of scraps, etc., may be added.

PHOSPHOR BRONZE FOR TELEGRAPH WIRES.

The substitution of phosphor bronze for iron in telegraph wires has already been alluded to in these columns, and we now refer to the following from *Cotton, Wool and Iron*, of Boston: The Phosphor Bronze Smelting Company, of Philadelphia, Pa., have been carefully experimenting for two years and over, upon a phosphor bronze telephone wire. Recent improvements in this seem to give it a front rank in the various kinds of material offered for this purpose. It does not tend to kink, will lie straight when unwound from the reel, and can be put up and handled with the same facility as other wire. Its resistance to corrosion is such that small wires, even numbers sixteen to eighteen, can be used without danger of rapid deterioration from the corrosive action of smoke, acid fumes, dampness, and the general obstacles. Its tensile strength is high, or about four times its weight per mile. It is very light weight, which fits it for long spans, and so small as to be hardly visible, and therefore free from the objection of the "unsightly telegraph wires." Its resistance is about one half that of iron wire of equal weight. Stubb's gauge, 16.065 of an inch in diameter, 66 pounds per mile, breaking strain 275 pounds. The calculated resistance 50 ohms per mile. These parties are now ready to fill orders for this in connection with their varied manufactures.

THE LARGEST WOOD PLANER.—Ship timbers require the services of large machines to handle them properly. A Bath, Maine, ship yard contains a planer supposed to be the largest in the world. It will work a piece of timber sixty-six feet long, five feet wide and two and one half feet thick. The keel comes from this machine perfectly true, ready for laying. The same yard contains a big beveling saw, which turns out timber sawed to any desired angle from horizontal. Curved timber and ship-knees can be worked true to the line by it. The same engine that runs these machines also drives a bolt cutter which bites off round iron up to two inches in diameter, a large and small circular saw, a machine for making tree nails, a band saw, planer, molding machine, and a plug and wedge machine. The exhaust steam is used for steaming timber preparatory to bending it.

THE STEAM ENGINE.—Taking the best types of engines of to-day as a starting point, we must depart in the following directions: We do not particularly need to increase the efficiency of the boiler as an evaporator, but we must increase its ability to withstand pressure without increasing its cost. We must decrease the friction of the engine and of the machinery of transmission to the point where the useful work is delivered. We must produce better vacuums in the condenser, and diminish its cost. We must diminish the cost of the engine. We must diminish the cost of the attendance on engines, boilers and machinery, and of lubrication. We must increase the durability of engines, boilers and machinery. Coal is too cheap even now to admit of increased economy of it at the cost of increased outlay for plant and attendance.

STEAM BOILER ACCIDENTS.—According to the annual report of the Hartford Steam Boiler Inspection and Insurance Company, there were 50 boiler explosions last year in sawmills and wood-working establishments generally. This is more than twice the number occurring in any other line of steam-using manufactures.

IMPROVEMENT IN SAWMILL MACHINERY.—A cotemporary says the great improvements in sawmills and machinery within the past few years give facilities for economizing in the production of timber, which people 20 or 30 years ago did not possess—not even in their dreams—and which make an incalculable difference in the amount of material and labor saved.

SCIENTIFIC PROGRESS.

The Exciting Property of Oats.

Experiments have been recently made by M. Sanson with a view to settling the question whether oats have or have not the excitant property that has been attributed to them. The nervous and muscular excitability of horses was carefully observed with the aid of graduated electrical apparatus before and after they had eaten a given quantity of oats, or received a little of a certain principle which M. Sanson succeeded in isolating from oats. The chief results of the inquiry are as follows:—The pericarp of the fruit of oats contains a substance soluble in alcohol and capable of exciting the motor cells of the nervous system. This substance is not (as some have thought) vanillin, or the odorous principle of vanilla, nor at all like it. It is a nitrogenized matter, which seems to belong to the group of alkaloids; is uncrystallizable, finely granular, and brown in mass. The author calls it "avenine." All varieties of cultivated oats seem to elaborate it, but they do so in very different degrees. The elaborated substance is the same in all varieties. The differences in quantity depend not only on the variety of the plant, but also on the places of cultivation. Oats of the white variety have much less than those of the dark, but for some of the former, in Sweden, the difference is small; while for others, in Russia, it is considerable. Under 0.9 of the excitant principles per cent. of air-dried oats, the dose is insufficient to certainly affect the excitability of horses, but above this proportion the excitant action is certain. While some light-colored oats certainly have considerable excitant power, some dark oats have little. Determination of the amount of the principle present is the only basis of appreciation, though (as already stated) white oats are likely to be less exciting than dark. Crusting or grinding the grain weakens considerably the excitant property, probably by altering the substance to which it is due; the excitant action is more prompt, but much less strong and durable. The action, which is immediate and more intense with the isolated principle, does not appear till some minutes after the eating of the oats; in both cases it increases to a certain point, then diminishes and disappears. The total duration of the effect is stated to be an hour per kilogramme of oats ingested.

THE NEW ELECTRIC UNITS.—The late Electrical Congress decided to make use of the centimeter, gramme and second in all electrical measurements. They decided to retain the old units of measurement—that is, the "ohm," as the unit of resistance, and the "volt" for the unit of electromotive force. They added the following new units: The "ampere," which is to represent the intensity of the current produced by one "volt," with the resistance of an "ohm;" the "coulomb" is to signify the quantity of electricity given by an "ampere" in one second; the "farad" indicates the capacity of the condenser, which, laden with a "volt" holds one "coulomb" of electricity. The old term "weber" is abandoned. Dr. Siemens, in his presidential address before the British Association meeting last summer, urged the retention of the "weber" as the unit of magnetic quantity, and suggested the addition also of another unit to represent the power conveyed by a current of an "ampere" through the difference of potential of a "volt." This he proposes to call a "watt," in honor of the great mechanician, James Watt. A "watt" would, therefore, represent the rate of an "ampere" multiplied by a "volt." A horse power will be 746 "watts." Tabulating these units, we would have: 1. Weber, the unit of magnetic quantity; 2. Ohm, the unit of magnetic resistance; 3. Volt, the unit of electro-motive force; 4. Ampere, the unit of magnetic current; 5. Coulomb, the unit of magnetic quantity; 6. Farad, the unit of magnetic capacity; 7. Watt, the unit of magnetic power.

PRACTICAL USES OF LIQUEFIED CARBONIC ACID.—The *Berichte* of the German Chemical Society of Berlin lately contained an interesting communication from Prof. A. W. Hofmann, calling attention to the extensive use of liquid carbonic acid for various purposes. It appears that the production and sale of the liquefied gas is a regular business, carried on on the large scale. The gas is condensed and sold by Krupp, of the world famous iron works at Essen. It is used mainly to compress steel castings in closed molds. It is placed in wrought steel vessels which hold about 200 pounds of the liquefied gas. A pressure of 800 atmospheres (about 12,000 pounds) is obtained. In Krupp's works all the ice is manufactured with the aid of a machine which is kept constantly at work by compressed carbonic acid. One of the most interesting applications of the condensed gas has been recently made in Berlin in connection with fire engines. Each engine is supplied with a large vessel containing the liquefied gas. This is brought into use as a motor the instant the engine arrives at the place of the fire, and some of the gas is thrown with the water upon the flames. As soon as a sufficient steam pressure is obtained, the use of the carbonic acid is stopped.

How Flies Climb.

Herr H. Dewitz has communicated to the Berlin Society of Natural History some facts that bear very strongly against the generally received theory that flies adhere to perpendicular walls and ceilings by virtue of some sucking power in their feet. He asserts that the feet of flies can not possess the sucking property ascribed to them, for they are hard and destitute of muscles. The theory has long been contradicted by the experiments of Blackwell, who found that flies could climb the sides of a jar under the receiver of an air pump, where there was no atmospheric pressure, and who asserted that the power of adherence was due to a sticky matter secreted from the foot hairs of flies. This assertion was generally regarded as not proved, and the case has rested there. Dewitz reports that his investigations have shown that Blackwell was right. He has watched the exudation of the sticky matter from the feet of the flies by fastening one of the insects to the under side of a plate of glass and viewing it under the microscope. A perfectly clear liquid was seen to flow from the ends of the foot hairs and attach the foot to the glass. When the foot was lifted up to be put down in another place, the drops of the sticky matter were perceived to be left on the glass, in the exact places where the foot hairs had rested. The adhesive fluid appears to pass down through the hollow of the hair, and to be derived from glands which Leyding discovered in the folds of the foot in 1850. A similar adhesive matter appears to be possessed by bugs, by many larva, and probably by many insects that climb the stems and the undersides of the leaves of plants.

Obtaining Oxygen from the Air.

A method of obtaining oxygen from air for technical purposes has been devised by M. Margis, of Paris, the principle being that of diffusion under pressure. Atmospheric air being forced against a caoutchouc membrane by suction, a mixture of about forty per cent. oxygen and sixty per cent. nitrogen is obtained on the other side. A second membrane increases the proportion of oxygen to sixty per cent., that of nitrogen being reduced to forty per cent. A third gives eighty per cent. oxygen, and a fourth ninety-five per cent. The membranes are prepared by immersing taffeta in a solution containing bisulphide of carbon (or light petroleum ether), spirits of wine, ether and caoutchouc. When dry, the taffeta has a fine layer of caoutchouc. A bag of the taffeta, with a framework of rings of galvanized wire, is placed in a cylindrical iron vessel admitting air. It is connected by means of a strengthening caoutchouc tube with the suction apparatus, which is formed of a cylinder containing a series of conical cups with small spaces between. Steam is forced through these cups, and draws in the gas obtained from the first diffusion, passing on with it through a cooler, where the steam is condensed and the gas is separated for a second diffusion. This latter takes place in a similar apparatus, except that the space round the bag is provided with a tube passing down into water, so that the pressure can be regulated and the superfluous gas be let off. After the air has passed through four of these bags, the final gas is collected in a gasometer.

IMPROVEMENTS IN SECONDARY BATTERIES.—On the authority of Prof. Ayrton, a well-known English physicist, a great improvement in the secondary battery has been effected by the union of the patents of Faure, Sellen and Volkmar. As a consequence, the following performance of the batteries in lighting the Pullman train on the Brighton (Eng.) line is reported: This train was formerly lighted by eighteen incandescent lamps, supplied by seventy accumulators. With the new accumulators, it is now lighted with forty incandescent lamps, the current of which is supplied by thirty Faure-Sellen-Volkmar cells. Prof. Ayrton reports on the advantages gained by the above named combination, as follows: The old accumulators weighed 130 pounds in working order, and gave a current equivalent to one-horse power for three quarters of an hour; whereas the new accumulator weighs only about seventy-five pounds, and yields a current of one-horse power for an hour. The flannel, or felt, is dispensed with, and the plates are so arranged that a defective one can readily be removed and replaced.

EXPLOSIVE ALLOYS OF ZINC.—Iridosmium is projected into fused zinc, the mass kept in igneous fusion for six hours, and the cooled ingot is treated with hydrochloric acid, to remove the excess of zinc, etc. When the graphite-like residue, washed and dried at 212° Fah., is heated to 575° Fah., it instantly takes fire—almost explosively—giving off fumes of zinc and of osmic acid. This deflagration occurs also, in a vacuum, but naturally without the production of either zinc oxide or of osmic acid. At this last named temperature there is, therefore, a change of state, attended with great development of heat, which in the air occasions combustion. This phenomenon is so marked, that by its means one or two per cent of iridium may be detected in platinum. Ruthenium and rhodium produce similar effects.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

Mining Share Market.

There are no special points to note in the mining share market. There have been no fluctuations of any great moment. Everything

MORE universally recommended than any proprietary medicine made. A sure and reliable tonic. Brown's Iron Bitters.

The action of, or effects produced by, acid on corrosive matter in feed water greatly depends in the nature and amount of solid matter in the water. When a boiler is entirely free from scale acid water may be used in some cases for a considerable time without its injurious effects being noticed on the face of the plate, but it will work its way under braces, into seams, etc.,

Scale in steam boilers is one of the evils all steam-users experience, and many suppose it to be a necessary one. This is not, however, the case, for, with proper care and use of suitable substances, the evil is one that can be overcome. In this city boiler-users are particularly affected, especially where well water is used, as is the case in so many places. And this is one reason that people are willing to pay high prices to the water company instead of having their own wells, as the mineral water seems to make heavy deposits in the boilers. Impure water and incrustation cause great expense for fuel and repairs. There is no subject connected with the use of steam of more importance than that of the proper care of steam boilers. Upon this depends not only the safety of life and property, but in a very considerable degree the cost of producing the required power. The most eminent engineers of the country now agree that the majority of explosions occur from impaired strength of plates and rivets, caused by overheating and corrosion, in consequence of the formation of scale on the inner surface of the boiler. But few engineers comprehend the danger from this cause. When a boiler is clean, the action of the water when under working pressure of steam prevents any active corrosion, but when the tubes and inner surface of the plates are covered with scale and incrustation, corrosive action is carried on very rapidly, thinning and weakening the plates imperceptibly, but surely.

The action of, or effects produced by, acid or corrosive matter in feed water greatly depends in the nature and amount of solid matter in the water. When a boiler is entirely free from scale acid water may be used in some cases for a considerable time without its injurious effects being noticed on the face of the plate, but it will work its way under braces, into seams, etc.,

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MORE universally recommended than any proprietary medicine made. A sure and reliable tonic. Brown's Iron Bitters.

SIERRA.
GOLD DISTRICT.—*Mt. Messenger*, March 31.—Thirty-one pounds of gold dust was the result of recent clean-up in the Union gravel mine at Gibsonville. The Brady City M. Co. has located a portion

of the Boyce Ravine for tailings. The claim extends from the company's sawmill down to the ravine, about 2,800 ft.

SCALES DIGGING.—Poverty hill and Fair Play companies are not working steadily, as water is scarce. Cleveland does better. Union hill, a week ago, cleaned up \$1000, that, for the length of run, was doing very well.

TRINITY.

THE QUARTZ DISCOVERY.—Trinity Journal, March 31: Mr. James Moore came in from the East Fork of North Fork on Thursday afternoon and brought with him a piece of quartz from the location made by Will Day, which adjoins the original discovery of which mention was made last week. This piece weighs about 20 lbs, and the face of it is literally covered with fine particles of free gold, many of which are visible to the naked eye, while an ordinary magnifying glass reveals a bonanza of wealth. Mr. Moore says that on the other end of his location Mr. H. Smith has good prospects from an extension of the same lode which has now been uncovered, in all, some 1,600 ft. The ledge, he says, has a general direction of North and South, is from 18 to 24 inches thick, and pitches into the hill at an angle of about 45 degrees. The piece he brought in is on exhibition at Sam Hensley's Gem Saloon. Further developments are anxiously awaited, but present indications certainly point to an enormous bonanza.

Nevada.

WASHOE DISTRICT.

UNION CON.—Enterprise, March 31: East crosscut No. 1, on the same level, is showing well, but has yet a considerable distance to go before ore can be expected. Good progress is making in lateral drift No. 2. It is a vein formation of a very favorable appearance.

SIERRA NEVADA.—Good headway is being made in the joint Union Con, east crosscut on the 2900 level. The face is in vein material which exhibits no feature worthy of special note, except that it is growing much softer. This probably indicates that the drift is approaching the point where may be expected the ore cut in the joint Union Con, winze, at the time Senator Fair was in charge of the north end mines.

CON. VIRGINIA.—Better progress is now making in the southeast drift on the 250 level, as a cooling-off station has been made near the face.

YELLOW JACKET.—The yield of ore from the old levels at the Winters shaft still holds up to 75 tons per day. A good deal of prospecting is being done at several points, and some good bunches of ore are being encountered at one or two points. At a few places small streaks of ore that are quite rich have been found.

OPHIR.—The joint Mexican east crosscut on the 3100 level is being pushed ahead as rapidly as possible. It is still in black and barren porphyry.

HALE AND NORCROSS.—Crosscutting will probably be commenced on the 26 level in a few days.

SAVAGE.—The joint Hale and Norcross north drift on the 2600 level is being pushed ahead as rapidly as possible, and is in a very promising vein formation.

BRENT AND BELCHER.—The north drift on the 2500 level is again being pushed ahead to connect with the southeast drift of the Con. Virginia on the same level. The face is quite hot.

GOULD AND CURRY.—Fair progress is making in the west drift on the 2300 level, though the indications are that there is a considerable amount of water out toward the west wall. This it will be a difficult matter to wholly avoid.

UTAH.—The work of cleaning out the pipe drift in the Sierra Nevada ground is approaching completion.

CROWN POINT.—The yield of low-grade ore from the old upper levels continues about as heretofore, and the mills on the river are kept constantly employed.

ESMERALDA DISTRICT.

THE NEW ESMERALDA.—Esmeralda Herald, March 31: Work still continues on this mine, and if the samples shown us Wednesday are a fair average of the ore that is now being taken out, then the owners may yet become millionaires. The ledge in the New Esmeralda is very wide, and the ore differs from that of any other ledge in the district.

THE QUINCY.—Mr. Booker informs us that he has men at work on the Quincy mine, on Humboldt Hill, and that some very fine ore is being taken out. This mine lies alongside the Silver Lining, and is not over 100 yards from the Silver Hill mill, Gregory Flat, which will make the Quincy a very valuable property when developed. It is owned by Messrs. Hooker & Kimball.

GILLIS DISTRICT.

WORKED.—Walker Lake Bulletin, March 27: The Yellow Jacket mine, in Gillis district, is being steadily worked. Various other mines and prospects are having work done on them, and those interested are very hopeful as to the general result. A great deal of chloriding is carried on in the district, and those engaged in the business are doing well. Shipments of ore are even now occasionally made to San Francisco and other points.

JEFFERSON DISTRICT.

AT WORK.—Cor. Belmont Courier, April 4: The stamps of the Jefferson S. M. Co.'s mill were dropped Monday morning and have been going steadily ever since. The work of converting the ore into bullion has therefore been commenced in good earnest and the camp started into what bids fair to become a prosperous career. Much ore is ready at hand awaiting treatment with more being shipped from the mines daily. In fact everything is wearing a bright appearance and the Jeffersonians are consequently happy. The mines are rapidly being brought into condition for systematic working reflecting creditably upon the careful management. There is considerable excitement among our local prospectors because certain of their number brought in specimens of very rich silver ore, taken from mines in the vicinity, which they claim to have recently discovered. The ledge is said to be from two to three ft wide and the lowest assay reached \$235, some going high in the hundreds. The specimens are very beautiful containing horn silver and chloride in considerable quantities. As the owners keep remarkably close about their find it is difficult to ascertain full particulars.

PINTO DISTRICT.

NEW ENTERPRISE.—Enreka Sentinel, March 30: Yesterday the Trustees of the Berryman Tunnel and

M. Co. met at their office in the Foley-Rickard building, on Main street, and completed their organization, when the following officers were elected to serve for the present term: M. H. Joseph, President; H. K. Mitchell, Vice President; D. K. Sessions, Secretary, and Richard Berryman, Superintendent. This company has been organized for the purpose of developing six mining claims, each 1,500 feet long by 600 feet wide, upon Silverado Mountain in Pinto mining district. The enterprise is one of importance, as the development of such a property will assist in opening up one of the most valuable sections of mineral land in eastern Nevada. Work on the property will be commenced Monday morning, under the direction of Richard Berryman, assisted by L. F. Dibble. These gentlemen are first class miners, and have had very great experience generally. They are also very familiar with the formation in Pinto district, in which they have worked successfully for several years. The properties adjoining the Berryman M. Co. paid handsome dividends in 1872 and 1873, and have been very profitably worked since that time, on lease or by private capital. None of these mines have been prospected to any great depth, but recent developments, particularly in the Diagonal mine, show that the ore bodies continue as depth is attained. The intention of the Berryman Co. is to thoroughly prospect their ground, and, by vigorous work this spring and summer, determine its value. The surface ground is rich in fine float rock, and is broken up and mineralized at almost every point. Unless all mining signs fail in this instance, the company are likely to find something before next winter that will repay them for their expenditures, and develop a property that will add materially to the wealth of this mining neighborhood.

SACRAMENTO DISTRICT.

MINING CLAIM SOLD.—Winnemucca Silver State, March 30: It is reported that H. J. Bender, who has been prospecting for some time in Sacramento district, has disposed of one of his mining claims to Oakland men, who intend to develop it. The ledge is in Sacramento district and is called the Philadelphia.

TAYLOR DISTRICT.

REPORTED SALE.—Hamilton Pine News, March 31: News reaches us from Hamilton that the report was current there that the Monitor property, in Taylor district, had been sold to California parties for the handsome sum of \$300,000; and the Gore mine, owned by Joe Carothers and M. B. Garaghan, for \$50,000.

TUSCARORA DISTRICT.

NORTHERN BELLE.—True Figure, March 31: The west drift from the bottom of the main winze from the fifth shaft level, has been extended 14 ft during the week, its total length now being 48 ft and the face is in a much softer formation. It is still showing sulphurets giving low assay. The shipments of bullion were valued at \$13,617.98 for the week ending March 29th; and the total shipments to the same date on March account being \$52,950.03. Another shipment on this month's account is yet to be made.

MOUNT DIABLO.—The slope above the connecting drift between winzes No. 1 and 2 shows 15 inches of \$70 ore. The east slope from winze No. 2 has developed 18 inches of ore assaying the same amount. There is a body of ore 2 ft in width, and of a value of \$75 per ton, in the intermediate slope, below the third level and west of winze No. 1. The stopes from the raise, north of the shaft on the second level, are turning out some ore that assays \$70 per ton, and those above the west drift from the Callison winze, are yielding several carloads of \$70 ore daily, and are looking well. An 18-inch ledge of \$100 ore has been found in the hanging wall of one of these stopes, and has an encouraging appearance. A shipment of bullion amounting to \$5,552.09 was made on the 27th inst.

WHITE PINE DISTRICT.

HAMILTON'S PROSPECTS.—Cor. White Pine News, March 31: It is current report that the Eberhardt tunnel is looking well and they will shortly resume work with their Burleighs. Captain Drake wears a smiling countenance, looks wise and says little. The Sweetwater Company has secured the services of Mr. Sam. Liddle, who has been with the Eberhardt Company for 13 years. Under his efficient management the Smoky mill is being thoroughly overhauled and put in tip-top shape in every respect, new pans, etc.

Arizona.

CASTLE CREEK SMELTER.—Gazette, March 30: The smelter for the Castle Creek copper mines, controlled by the Collier Co., is expected to arrive at Maricopa, the latter part of next week. The company now has about thirty men at work on the road, leading from the mine to the site of the smelter, in Castle Creek, a distance of about two miles. At present there is quite a respectable settlement at the Collier mine and also at the Jones Springs, and after operations are once commenced it is presumed that a still larger number will be there. No work is at present being prosecuted in the mine, nor will a force be put on until a smelter is in readiness, inasmuch as there is plenty of ore out already for quite a respectable run.

NOTES.—Mohave Co. Miner, March 25: Robert D'Yhr informs us that he expects some parties out from Chicago very soon to examine the Oro Fino mine, owned by himself and Louis Davidson. The mine is looking splendidly. Work is being vigorously prosecuted on the Indian Boy mine, at Stockton, and arrangements have been made to ship large quantities of the ore to the Hubbs smelting works at Albuquerque. There are quite a number of new locations being made in the Cedar district, and several rich finds are reported. Cadden and Ewing have made another rich strike on the Diana mine, at Chloride. In crosscutting the ledge in a new place, they found a streak of ore two feet wide, showing horn silver, which he says will go \$400 to the ton. The ledge is twelve feet wide. Davis & Styles have gone to Music Mountain to work on the Fairview mine. H. A. Owen, familiarly known as "Chloride Jack," was in town last Wednesday, accompanied by John Gird. They left here on Thursday for Owens' copper claims in Cedar district. Ed. Cavanaugh is working on the Snow Flake mine, at Layne Springs, and is taking out some good ore.

NEW DISCOVERY.—Arizona Miner, March 31: About ten days since, Mr. James Tighe, a miner residing on Lynx Creek, discovered, near Knapp's

Gulch, a very wonderful ledge, rich in gold and silver. Croppings presented for our inspection carry gold in abundance, and is entirely free from sulphurets. Assays made show the ore to carry about \$150 in gold, and \$150 in silver. From the location of the ledge, only two miles from Howell's smelter, its width two feet, the character of the ore being high grade and free, we consider this one of the best finds for Lynx Creek yet made. Mr. Tighe has located, in this valuable property, with him a well known mining man of southern Arizona—Mr. Hugh Hutchinson—who will, no doubt, find his way here very soon, and open up this excellent property. Mr. Tighe, who, by the way, is a typo, has named the new discovery M. O. D. Extensions have been taken up, and the general impression is that the most valuable ledge of the district has just been found. Thus we have it, new men continually discovering in the vicinity of the capital of Arizona, bonanzas which have escaped the notice of "old timers." We are always pleased to hear of the good luck of new comers to our country. There are yet hundreds of fine properties undiscovered, awaiting the advent of the right one. Even though a hundred years shall lapse before that time arrives.

THE HOWELL SMELTER.—Arizona Miner, March 31: Few people, even amongst those who visit the Howell smelter, appreciate the magnitude of this institution. The placing of works of this size, costing, when completed, at least \$200,000, is certainly an earnest of the belief which Mr. Howell and his associates have in the permanency and richness of the mines in the vicinity of his smelter. So great has been the effect of the location of the smelter, that a town has sprung into existence near it, and houses have been erected all along the creek for a distance of over a mile above. Hundreds of men are at work in the vicinity of the smelter burning coal, and the hills and mountains are full of prospectors, and miners are taking out large quantities of ore from various localities. Dr. Mulvane, one of the A. & P. railroad company directors, visited the Howell smelter and inspected the mines in the vicinity. The gentleman was much pleased with the mineral wealth of Yavapai county, and his visit will no doubt have some effect in hastening the building of our railroad. The Howell smelter is the most extensive and marked enterprise ever inaugurated in this county, and marks an era in our prosperity which will soon be felt throughout entire Northern Arizona.

DOS CARREAS COPPER CO.—Tombstone Epitaph, April 3: Copper mining is being carried on quite extensively in camp. Many copper mines that were thought to be worthless have lately been located, and work commenced on them, and all show well as work progresses. Among the best are the Starr King, Isabella and Green Monster, all three on one ledge and owned by W. F. Bennett. The ledge runs north and south, and is at least 100 feet wide the entire length of the three claims. High-grade copper ore is found in different places. On the Starr King and Isabella ore is found that assays as high as \$80 in gold and \$30 in silver, and nearly all the ore assays from four to fifteen per cent. copper. Some few men are working on Emersy's mines, taking out ore for shipment. The Commonwealth company has stopped all work on their mines in Wood canyon, and Mr. Nash, the superintendent, has gone to San Francisco. The president of the company is expected here in about a month, when it is thought work will be started again.

Colorado.

LEADVILLE NOTES.—Herald, March 31: The Wilson tunnel, on Printer Boy hill, is making steady shipments from a good body of pay ore. The Nellie S. ore body continues to improve and now shows over twenty feet in thickness. Regular shipments are being made. The south end of the Fannie lode is being worked under a lease, by Postmaster Jones, of Oro, and shows some good looking ore. About fifteen men are now employed upon the Florence, on Printer Boy hill, and a new shaft is being sunk near the Nellie S. line. In the Birdie R., on Sugar Loaf, the levels have been started north and south at a depth of 100 feet, and both show two feet of ore. The Eagle M. Co. is working three shifts on the Bob Sheppard lode. They have a very fine plant of machinery, and are pushing development. Sam Ford and others are working the Paymaster, in Iowa gulch, with very favorable prospects. A body of iron and hard carbonates has already been opened up in the present workings.

GILPIN COUNTY.—Register-Coll, March 31: The National bank shipped, yesterday, \$5,900 in gold bullion. Hanington & Mellor shipped \$3,500, a total of \$9,400. Supt. Geo. W. Barrett, of the Rollins G. & S. M. Co., left at the First National bank, yesterday, two golden eggs, or retorts, having an aggregate weight of 130 ounces. The retorts were the result of a two weeks' clean up of 31 stamps employed in crushing ore from the Perigo mine, on Perigo mountain, Independent district. The excitement over the recent finds of silver bearing ore on the mountains east of North Creek, below the toll gate in Black Hawk is unabated. The last strike reported is that made day before yesterday by James Fisher, of Central. James is a practical miner and is not easily excited, but he insists that he has a good vein uncovered. As the snow disappears west of the city, prospectors begin work on locations made by them last summer.

Idaho.

WOOD RIVER ITEMS.—Wood River Times, March 30: The men driving the Strahorn tunnel, in Bald Mountain, opposite Hailey, cut through a ledge, yesterday, which carries ore, and the ground in the face is becoming softer with indications improving for a strike ahead. Dr. S. B. Miller is purchasing tools and supplies to place miners at work upon the Rising Sun mine, owned by his company, as well as upon the Great View mine. These two locations join Barney Quigg's claims. The Rising Sun is supposed to be the extension of the Ophir, and on the O K vein. William Gaughan has cut a ledge near the O K boarding house and located all the ground unlocated, which gives him a fraction only, but if the ledge opens well it will be a good property. The Lincoln group, after patents shall be secured, will be incorporated, and a company organized at Chicago, under the laws of Illinois, to develop it. Martin Curran has continued work upon his find of a month ago, and yesterday came into a larger body of galena. The claim is in the sidell back of the Bullion company's office. Mr. Curran

is now superintendent of the Wood River Mining Company.

SAWTOOTH.—Salt Lake City Tribune, March 30: One of the most promising mining districts in Idaho is that known as the Sawtooth, located north of Wood River, just beyond the divide, at the headwaters of the Salmon river. This district has been in the way of development the past three or four years, and yet no very decided progress was made until the seasons of 1881-2. Now the numerous properties have so far advanced that we may confidently look for a large output of ore and bullion this season. In Vienna Gulch the mines are looking remarkably well, and the 20-stamp silver mill is so far completed and supplied that in a few weeks it will begin sending bullion to market. In Sawtooth Gulch there is the Columbia & Beaver mill in readiness for work as soon as ore in sufficient quantities can be had to keep it going, and this can be had, we understand, as soon as the company is ready to purchase. There is a bright promise of active times in this gulch as soon as the season fairly opens. The Milgrim mine, at the upper end of Beaver Gulch, has been so well developed as to need a mill to reduce its ores. Further up, and near the summit of the Sawtooth Range, is located the property of the Sawtooth Gold and Silver Mining Company of Idaho. This company is composed largely of Utah citizens, and may be considered a local organization, owning six valuable mining claims and having its capital stock divided into 150,000 shares, the par value of which is \$10 each. By the early completion of the railway to Hailey, Idaho, Sawtooth district is brought in such close connection with the road as to make property there more desirable than it has been in the past, and we feel confident that even better facilities are soon to be afforded by the extension of the road up the river to a point much nearer.

Montana.

SILVER MINES.—Inter-Mountain, March 31: Despite the accident which interfered with the extraction of ore from the Magna Charta for two days, and also the mislay which befell one of the mill roasters, necessitating its being stopped for repairs, the operations of the Alice company for the past month have been entirely satisfactory, and the bullion output will somewhat exceed \$50,000. Yesterday the new mill worked 6½ tons of roasting ore and the old mill 25½ tons of free ore, or a total of 92 tons of ore. The chlorinations were 84, the amalgamation 86, and the product of the day was \$3,216.94. In the amount of ore treated this is the best run the mills of the Alice company ever made. Developments in the Alice are progressing as usual. On the 100 south level 20 tons of free ore are extracted daily, which amount could be largely increased if necessary. The Magna Charta is producing, daily, 60 tons of ore, and keeps the stamps of the big mill well supplied. The most important development of the past week is the striking of the pay chute on the 500 level at a point 90 feet west of the crosscut, where three feet of 40 ounce ore is exposed. The condition of the Moulton at the present time is of a character to inspire even greater confidence than ever in its continued productiveness. The new surface strike recently recorded on the south vein is being developed with splendid success, the bottom of the shaft, which is now about 30 feet deep, being all in ore of exceptionally fine quality, locket samples assaying from 75 to 100 ounces. In the stopes between the 200 and 100 levels the ore body retains its width and richness, and the miners are extracting about 30 tons of 40 ounce ore per day.

New Mexico.

LOCAL NEWS.—Southwest Sentinel, March 31: A new discovery has been made in the Burro mountains, west of Bullard's Peak, and near the Gila river. Four claims have been worked and show a carbonate ore with galena and copper. The Pocahontas has a shaft 29 feet deep, with ledge three and one half feet wide, another eight feet deep and ledge eight feet wide. Little Chief has a 30-foot tunnel showing carbonates. The Carbonate Queen, near by, is now being prospected and shows galena, copper and carbonate running 80 ounces silver and 45 per cent. lead. These locations are owned by Christian, Smith, Michaels and Humphrey. Late reports from the Black Hawk show the mine is looking better than it ever did. As soon as the machinery for hoisting arrives a large amount of ore will be ready, and the Bullard's Peak district bids fair to be one of the best in the southwest. On the Silver King, in this same district, work is progressing rapidly, and the outlook of the mine improves as the shaft goes down. The Atlantic, owned by Messrs. Cases & Twomey has had some work done upon it, and the outlook is encouraging to the owners. The Young Ireland and Young America have one shaft of 30 feet, one of 80 feet and one of seven feet. The ore in each looks well. These claims are owned by Messrs. Carey and Kerr. Reports from the Black Diamonds show the streak is looking better than formerly. A contract for sinking 25 feet has been let on the Morrison claim. This will make the present shaft some 40 feet deep. It is the intention of the owners to sink further. The vein is 18 inches wide close to a smooth foot-wall of granite.

Oregon.

NOTES.—Jacksonville Times, March 31: Placer miners have generally been disappointed by the unusually dry winter season. Wimer & Sons have their mine, near Waldo, in good running order, and expect to make a big clean up. H. L. Hanson has sold his interest in the drifting claims, near Applegate postoffice, to his partner, Thos. Berryman, for \$600. Bybee & Co. are still working their mines, near Waldo, with half a head of water. They will next raise the source of their ditch, when a good supply will be afforded them during the greater part of the year. Green Bros., of Galice creek, have a large amount of ore on their dump, which will pay from \$50 to \$100 to the ton, and are probably crushing it before this time. They have a rich ledge, that is constantly improving. The Roseburg Plunderer, speaking of the smelting works that W. Q. Brown & Co. propose putting up at Piney, Douglas county, says that they are intended to be of a sufficient capacity to give employment to 150 persons. W. W. Graham, who is engaged in mining in the Siskiyou mountains, was in town this week. He reports that several claims are being worked on Grouse and Beaver creeks, with promising results. His company are groundsluicing just below the mouth of Grouse creek, where coarse gold seems to exist in considerable quantities. Patterson Bros. have a hydraulic and giant, and are piping with good effect. The other miners also seem to be doing well.

An industry dependent upon charcoal as fuel must, to be permanent, maintain large forest areas, thus benefiting the surrounding country and much of the growing timber being suitable

for other purposes than charcoal-making, will be so used whenever the compensation is greater. Anomalous as it may at first appear, the probabilities are that, in the near future, the large consumers of charcoal will be among the most enthusiastic patrons of forest cultivation and preservation.

THE ENGINEER.

THE CHANNEL TUNNEL. The foolish discussions of the English politicians in regard to the military problems and dangers to England from the construction of the Channel tunnel do not seem to have much influence in retarding the actual work upon that great engineering work. The new plans issued by the channel tunnel companies contain some important alterations, both companies having altered or amended their original plans with a view to meet the requirements of the objections or recommendations of the channel tunnel commissioners. The amendments shown by the southeastern company are a great improvement in point of defensibility on their previous plan. It is proposed to carry the present lines inland to the extent of about three miles, and then run down the Alkham valley, forming a detour and joining the southeastern main line at the Pier station. This would bring the entrance and approach to the tunnel well within the range of the defenses of the garrison of Dover. A branch line will also connect the London, Chatham & Dover line at the upper end of the town. The channel tunnel company have abandoned their plan of beginning the tunnel at Dover, and have reverted to their old scheme of commencing a descent to the base of the tunnel at St. Margaret's, in the vicinity of Kearsney, about three miles from Dover. Another item reads as follows: The channel tunnel scheme is vigorously agitated, with a view to securing concessions in its favor. By the one mile and a quarter bore on the French side, the French engineers have shown they can proceed to Dover at the rate of 132 feet daily. This would complete a gallery the whole way across in a little over eighteen months. French enthusiasm on the subject takes no account of the English opposition.

FROM SEA TO SEA—ONCE MORE.—Mention has already been made, in this column, of a proposition to construct a ship canal from the head of navigation on the Tyne, which empties itself into the North Sea, to the Solway Frith, which enters the Irish Sea. The distance from sea to sea is about 80 miles, of which but 12 are navigable. The mouth of the latter is flat and for some distance up is a naked flat at low tide. The tides upon the opposite coasts are very large and return with great violence. The spring tides upon the North Sea coast have a rise of 18 feet; upon the coast of the Irish Sea the flow is 11 feet. Of course one or more locks will have to be constructed in connecting the waters of the two rivers. The work will be one of great interest to the coast commerce of Great Britain. Engineers are engaged in the necessary surveys for the preparation of plans and estimates. In the meantime a notice of motion in favor of the project has been given at a meeting of the Newcastle Town Council.

DRIVING PILES WITH DYNAMITE.—A correspondent of the *United States Miller*, in Budapest, Austria-Hungary, in a recent letter, mentions an interesting experiment in pile-driving by the use of dynamite. The piles experimented on had already been driven by an ordinary pile-driver, but it was desired to drive them down further. An officer of the military engineer corps was detailed to superintend the experiment. The piles were squared and the top covered by a wrought-iron plate fifteen inches square and four and a half inches thick. A seventeen and a half ounce charge of dynamite in the form of a cake six inches in diameter, wrapped in paper and clay was placed on the centre of each plate and fired. The effect produced was estimated to be equal to five blows of a 1,500-pound hammer, falling from a height of ten feet.

FROM THE BALTIC TO THE OCEAN.—Again the new ship canal between the Baltic sea and the German ocean is coming to the front. It will save a journey of 600 miles for a vessel making a trip between either of these waters, as the circumnavigation of the Peninsula of Jutland will be unnecessary. But the possession of this canal will necessitate Germany becoming a first-class naval power, with all the expense and responsibilities which that involves. In all, the proposed canal will be only fifty miles, or half the length of the Suez canal, and it will extend from Glückstadt to Kiel.

A GREAT NEED.—There can be no doubt, says the *Engineer*, that the inventor who could supply in a really portable form a machine or apparatus which would give out two or three horse power for a day would reap an enormous fortune. Up to the present time, however, nothing of the kind has been placed in the market. Gas is laid out to most houses now, and gas engines are plenty enough, yet they do not meet the want which a storage battery may be made yet, perhaps, to supply.

FLOODING THE SAHARA.—Recent telegraph dispatches from Tozer, Tunis, say that De Lesseps has arrived there. He asserted that explorations make it plain that creating an inland sea in the desert of Sahara is practicable, and it can be accomplished by using 100 excavating machines, equal in the aggregate and capacity to the labor of 100,000 men.

USEFUL INFORMATION.

Improvement in Shoemaking.

The *Boston Herald* gives the following account of a new process in sewing shoes, the invention of Mr. Lee E. Moore of that city, which it is said promises to revolutionize the whole business, being extremely simple but decidedly practicable, as it is equally applicable to ladies' work as to that of heavy work for men. Heretofore in the manufacture of hand-sewed work, the upper leather, which remains after sewing the welt to the inner sole, has either been cut off or tacked down and the space filled; but by the new method the upper, after having been fastened to the sole, is turned back over the welt, and in turn is again sewed to the outer sole, thus making the boot doubly strong, and making it virtually waterproof. In case a poor inner sole is used, so that the sewing gives way, the welt still acts as a lever, and there is no possibility of the upper pulling out. In the manufacture of common work for women, where machines are used, there is a rough seam left on the inside of the shoe, which is decidedly uncomfortable to the wearer, whereas if made by the process alluded to, the inside of the boot is left perfectly smooth. Then, again, by the old method nails are used to a greater or less extent in lasting, which in due time give the wearer unmeasurable discomfort, but this is entirely obviated by the new process, as no nails are used as the upper does not require to be fastened to the inner sole except by the sewing. Those who have investigated the process are loud in their praises, and compliment the inventor highly upon his success, and it is a fact that manufacturers of shoe machinery are already at work endeavoring to produce a machine which will accomplish the work which is now done by hand, and with a good prospect of success. This process, it is stated, enables hand-sewed goods to be made within a few cents per pair of cheap machine work.

DYEING LEATHER.—In the glove trade the leather has hitherto always been dyed by brushing on the dyes by hand. The defects of this method are: Its slowness, the occurrence of large, soiled edges on the fleshy side, and notwithstanding every care being taken, the uneven character of the dye produced. To avoid these, Joseph Kristen, of Brunn, has a process in which even dyeing is obtained by the application of centrifugal force. The skin to be dyed is fixed on the center of a horizontally rotating disc; the color is also fed on to the center, and by the rapid revolution of the disc is spread equally over the whole surface. The color is forced on to the disc by means of a pump, or it merely flows from a reservoir standing at a higher level. The excess of color driven off at the edges of the revolving disc is collected and used over again, until the skin is fully dyed. To dye one skin by this method takes from ten to fifteen minutes. A single pump may serve at least for five machines, which would require only one attendant, so that, by the above arrangement, one man could, in twelve hours, easily dye 150 skins, possessing great evenness of dye and free from spotting.

AN "OLD CURIOSITY SHOP" will be one of the features of the approaching Railroad Exhibition at Chicago. The building will be especially designed for its purpose, and will contain a most interesting collection of the earliest railway appliances, and curious and attractive articles from every department of railway service. One of the most remarkable objects in this collection will be George Stevenson's "Rocket," the first locomotive ever built. A cablegram from Commissioner Peters, who resides in London, states the directors of the South Kensington Museum have consented to permit their almost sacred relic to be sent across the Atlantic to be placed in the exposition. Several other very old locomotives have already been secured for the exhibit, one of which will be brought here by the engineer who ran it forty years. The universal attention which this exhibit and others to be located in the annex will attract must necessarily make the ground space of the court as valuable and desirable as that in the present building.

CHEAP BLACK INK.—The *Industrie Blatter* recommends the following formula as furnishing a good and cheap writing ink: French extract of Campeachy wood, 100 parts; lime water, 800 parts; phenol (carbolic acid), 3 parts; hydrochloric acid, 25 parts; gum arabic, 30 parts; red chromate of potash, 3 parts. The extract is first dissolved in the lime water on a steam bath, with frequent stirring or shaking, after which the carbolic and hydrochloric acids are added, and change the red color to a brownish yellow. It is then heated half an hour on steam bath and set aside to cool. It is next filtered, and the gum and bichromate, dissolved in water, are added. Enough water is then added to make up the solution to 1,800 parts. This ink is a fine red when used, but soon gets black.

UTILIZING COTTON SEED.—One ton of cotton seed yields thirty-six gallons of crude oil, worth about \$18. The hull from a ton of seed weighs 900 pounds, and the meal before pressing weighs 1,100 pounds. The oil cake is worth \$27 to \$30 per ton. It is calculated that there is a net profit of about \$9 in grinding the seed of a bale of cotton.

MARQUETRIE WORK. Of recent years inlaid veneer or marquetric has attained a remarkable position, and may be said now to have established itself as a permanency in the cabinet work of the age. A quick way of making this inlaid work that has been employed in the United States for some time, is to arrange the pieces of veneer alternately walnut and maple, for instance—and with a very fine marquetric saw cut the pattern through all the pieces as they lie piled upon each other, thus arranged according to the kind of wood. When this is done the cabinet-maker has a quantity of veneers before him of various woods with the pattern cut out of each, and on the other hand a quantity of fragile cuttings in the larger pieces. All that is now necessary to be done is to set the maple pattern in the walnut veneer, or vice versa, and the marquetric is complete. This has the double advantage of cheapness and durability, and the process is one that has the merit of allowing rapid work, and usually of a satisfactory character.

JOINING LEATHER TO IRON.—The best cement for joining leather to iron, as for covering iron pulleys, is said to be made as follows: Soak equal parts of common glue and isinglass for ten hours in just water enough to cover them. Bring the whole to nearly the boiling point, and add pure tannin until the mixture becomes ropy, or appears like the white of eggs. Buff off the surfaces to be joined, apply the cement, and clamp firmly.

COPPER IN BREAD.—Some time ago Dr. J. Vander Bergh was struck with the constancy of the proportion of copper found in bread, and made an examination of wheat. In 1,000,000 parts of the grain were 9.24 of metallic copper, and oats yielded 10.8 parts in the same quantity. He made, of course, the usual preliminary tests to ascertain the purity of his reagents, and he took care that his gas burners were made of iron. Even the porcelain capsule was supported on a platinum triangle.

BLACKING IRON AND STEEL.—A brilliant black can be produced, it is said, on iron and steel, by applying, with a fine brush, a mixture of turpentine and sulphur boiled together. When the turpentine evaporates there remains on the metal a thin layer of sulphur which unites closely with the iron when heated for a time over a spirit or gas flame. This varnish protects the metal, and is quite durable.

A CORRESPONDENT of the *American Machinist* gives this rule for finding the length of a belt to connect two shafts having unequal pulleys: Add the diameter of the two pulleys together, divide the result by two, and multiply by three and one fourth; add the product to twice the distance between the centers of the shafts, and you have the length required.

GOOD HEALTH.

Sleeplessness.

Druggists tell us that there is a growing demand for various medicines and preparations containing opiates in one shape or another. People wreck their nervous systems by injudicious habits of life, and the result is unsound sleep, dyspepsia and countless other evils. A little advice to such persons may not be out of place. They should, of course, be careful to abandon that method of life which brings them into physical disorder. Their complaint may be fed by tobacco; narcotics should be avoided. One cause of their trouble may be that they take insufficient outdoor exercise. Perhaps they drink too much tea or coffee, or eat too much flesh meat. There are a thousand practices allowed by convention which are themselves harmful and prejudicial to the health.

The quality of sleep may be improved by diminishing the length of time spent in bed. A hot shower bath at bed time cleanses the skin and predisposes sleep. Many a toiling business or literary man goes to bed tired and worn out, only to toss about wearily from one side to another. His brain is hot and full of blood, while his feet are cold. He thinks over again the thoughts that have been engaging his attention during the day, or does over again the business that has called forth his energies for twelve or sixteen hours past. His night is a round of tossing to and fro. Is there any wonder that, failing to find out what is the true and natural remedy for his pains, he resorts to opiates, which he knows will give him temporary relief.

The want of balance between mental and physical labor is a fruitful cause of sleeplessness. Many a business man, whose duties keep him in an office all day, would improve his health a great deal if he were to fit up his attic as a carpenter's shop, and spend an hour therein after supper. This, of course, would be beneficial only if he happened to have a liking for mechanics; then he would find his occupation afforded him amusement, mental occupation, and muscular effort in just the proper proportions.

Some people waste their nervous energy through morbid introspection and dwelling upon the past. Some can do with ease as much physical labor as would kill other men. The same is true of mental labor. Strict honesty, regular habits, a careful diet, plenty of exercise, and a clear conscience—with these a man need not suffer much from sleeplessness.

Surgery for Engineers.

It is beginning to be understood, says the *Scientific American*, that a limited knowledge of operative surgery, certainly enough of the art to enable a man to tie an artery, staunch a flow of blood, or bind up the wounds of an injured workman or traveler, is highly desirable, if not vitally necessary, to mechanics and engineers. This is especially true of the foreman of machine shops, engine drivers and civil and mining engineers. In many manufacturing operations, and in all works of constructive and mining engineering, accidents are always liable to happen, and not infrequently the needed surgeon is miles away. In any case, the advantage of having close at hand some one familiar with the first treatment of serious hurts, who can do what is needful to be done in such emergencies to keep the patient's life from wasting before the regular surgeon's help can be obtained, is beyond question. Hitherto, so far as we know, provision for this important line of instruction for young engineers and foremen in constructive works has never been made by our technical institutions. The trustees of the University of Pennsylvania, however, have now taken the first step in a movement in this direction, and have engaged a lecturer on operative surgery to give a course of lectures on surgery to the senior scientific classes of the collegiate department of the University, especially the mining and engineering sections. The innovation is a good one.

LIME JUICE IN THE TREATMENT OF DIPHTHERIA.—M. Czartorski, M. D., of Stockholm, California, writes as follows to the *London Lancet*:—During a prolonged residence in the interior of China, I became acquainted with the fact that the Chinese place great reliance during epidemics of diphtheria on the internal use of the fresh juice of limes, and of the fruit itself, which they consume in enormous quantities, in every conceivable form—as lemonade, with native spirits, cut in slices, etc.—during attacks of this dreadful disease, with apparently most successful results, it hardly ever failing to effect a cure. The Chinese consider it a specific, and will, in case of need, do anything to obtain a supply. Since I have come back to California, as also in Louisiana, I have used limes and their juices in my practice as a physician with most successful results in cases of diphtheria, even in the most desperate cases. As soon as I take charge of a case of diphtheria, I order limes to be administered as freely as possible, in any manner the patient can be prevailed upon to take them, especially in the form of hot lemonade, sweetened with white sugar or honey, or cut in slices with powdered white sugar. Besides lime juice (which I suppose acts by imparting an excess of oxygen to the circulation, and thereby prevents formation of vibrios, etc., and so has almost a specific effect on disease.) I prescribe whatever drug may be indicated to relieve symptoms as they develop, and impart strength by appropriate stimulants and nourishment.

SIMPLE ANTIDOTE TO NICOTINE.—M. Armand (*Chemical News*) states that the deleterious effects of the use of tobacco can be counteracted, if not entirely annihilated, by moistening the tobacco when in course of preparation, previous to its delivery to the consumer, with a strong infusion of watercresses, since the author has discovered that this vegetable contains principles which, without destroying the peculiar aroma of tobacco, destroys the deleterious effects of nicotine.

LONG CONTINUED BATHS.—Professor Kaposi of Vienna has introduced continuous baths for skin affections. The patient is placed in them on a mechanical bed, and remains there for fifty or one hundred days, not only taking his meals, but sleeping while thus immersed in water. The *Progres Medical* pronounces them successful, and recommends their introduction into the Paris hospitals.

LIME WATER AND MILK.—Experience proves that this mixture is food and medicine both to the young and old, when the functions of digestion and assimilation are feeble. A stomachaxed by gluttony, irritated by improper food, inflamed by alcohol, enfeebled by disease, or otherwise unfitted for its duties, will resume its work, it is said, and do it energetically on a diet of bread and milk and lime water; four table-spoonfuls of the latter to a pint of milk.

THE problem of life has been solved by an Italian who keeps an eating house in New York. His bill of fare is governed by the following regulations: Coffee or tea, per cup, one cent; soup, per bowl, one cent; pie, per cut, two cents; beefsteak, four cents; roast meats, four cents; chicken stew, five cents; ham and eggs, eight cents, etc. Many a hungry stomach desires to know "Where's his place?"—*N. Y. Graphic*.

TO DESTROY WARTS.—A correspondent of the *British Medical Journal* (Jan. 13th, p. 90), states that he has found the application of a strong solution of chromic acid, three or four times, by means of a camel's hair pencil, to be the most efficient and easy method of removing warts. They become black, and soon fall off.

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SAN FRANCISCO:

Saturday Morning, Apr. 7, 1883.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Huyett & Smith's Exhaust
Fans and Pressure Blowers, 233. Anodonta Cygnea, or
Swan Mussel, 241.EDITORIALS.—Exhaust Fans and Pressure Blowers;
Manufacture of Borax, 233. Passing Events; Deter-
mining Sediment in Suspension in a Stream; New Spec-
ies of Genus Homo; Death of Peter Cooper, 240.
Fresh Water Pearl Mussels; Rapid Tunnel Work; Early
History of the Comstock, 241. Patents and Inventions;
Notices of Recent Patents, 244.MECHANICAL PROGRESS.—Thoughts on Belts;
Economical Gas Generators and Engines; Some Causes
of Boiler Corrosion; A New System of Melting Iron;
Phosphor Bronze for Telegraph Wires; The Largest
Wood Planer; The Steam Engine; Steam Boiler Acci-
dents; Improvement in Sawmill Machinery, 235.SCIENTIFIC PROGRESS.—The Exciting Property
of Fast; The New Electric Unit; Practical Uses of
Liquefied Carbonic Acid; How Flies Climb; Obtaining
Oxygen from the Air; Improvements in Secondary Bat-
teries; Explosive Alloys of Zinc, 235.MINING STOCK MARKET.—Sales at the San
Francisco Stock Board, Notices of Meetings, Assess-
ments, Dividends and Bullion Shipments, 236.MINING SUMMARY.—From the various counties of
California, Nevada, Arizona, Colorado, Idaho, Montana,
New Mexico and Oregon, 236-37.THE ENGINEER.—The Channel Tunnel; From Sea
to Sea; Driving Piles with Dynamite; From the Baltic to
the Ocean; A Great Need; Flooding the Sahara, 239.USEFUL INFORMATION.—Improvement in Shoe-
making; Dyeing Leather; An "Old Curiosity Shop;"
Cheap Black Ink; Utilizing Cotton Seed; Marquette
Work; Joining Leather to Iron; Copper in Bread; Black-
ening Iron and Steel, 239.GOOD HEALTH.—Sleeplessness; Surgery for En-
gineers; Lime Juice in the Treatment of Diphtheria; Simple
Antidote to Nicotine; Long Continued Baths; Lime
Water and Milk; To Destroy Warts, 239.MISCELLANEOUS.—The New Train on Metals; A
Great Ditch Enterprise; 234. Charcoal as a Fuel for
Metallurgical Processes, 238.

NEWS IN BRIEF.—On page 244 and other pages.

BUSINESS ANNOUNCEMENTS.

Dividend Notice—Standard Con. Mining Company.
Dividend Notice—Navajo Mining Company.
Assessment Notice—Buchanan Gold Mining & Milling Co.
Notice to Contractors—Brandy City Mining Company.

Passing Events.

The fine weather which has prevailed since the recent welcome rain storm in this State has been good for both miners and farmers. The streams all increased in volume, and made water plenty, and the reserves of snow in the mountains ensure water for some time to come. The coming season will be much more prosperous than was hoped for.

This month many hundred prospectors start out on their season's work. In the more temperate regions they are now on the hillsides, and they are following up the melting of the snows in the colder and more mountainous lo-
cations.

It is worthy of note that the strike reported in the Contention mine, at Tombstone, Arizona, of a fine body of ore on the 600 level demon-
strates, almost to a certainty, the existence of mineral below the water level, and assures a bright future for the camp. The *Epitaph* states that the demonstration of this fact has been awaited with much suspense for months past, as it was felt that unless deep mining could be successfully prosecuted, it was hardly worth the expenditure of the time and money required to develop prospects only to water level. The striking of good ore almost at the water level is fairly conclusive to experienced miners that it will exist below, and a more secure feeling of the permanence of the mines and the attendant business prosperity of Tombstone is felt.

Determining Sediment in Suspension in a Stream.

A knowledge of the amount of sediment being carried at any given time in a stream is something people often want, especially in California. But the fact is that the determination of the quantity of sediment carried in suspension by a stream requires much skill and care, and any observations taken by an unskilled observer will show exaggerated results. For the use of miners and others we here give the proper method of determining the amount of solid matter carried in suspension by a sediment-bearing stream:

First—The samples taken must fairly represent an average or mean of the whole water flowing; therefore samples should be taken as nearly at the same time as is practicable from different points, both in depth and position in the stream.

Great care in obtaining these samples must be observed, or exaggerated results will be arrived at. If the vessel in which the water is caught is allowed to remain for any length of time in the stream, sediment will necessarily be deposited in it, coming from other water than that held by the particular water contained in the vessel, as the current of the stream will be somewhat checked by the vessel itself, which, of course, results in the deposit or dropping of sediment.

Hence, engineers in making such determinations take great care, and use apparatus especially prepared for this purpose. It must be kept in mind that any errors of this kind will throw always exaggerated quantities of sediment, and never too little.

Second—After samples are taken they are allowed to settle for quite a length of time; then the water is slowly evaporated by placing the vessel on hot sand. After the moisture has all evaporated the residuum of sediment is weighed, and this result compared with the weight of the sample as first obtained. The proportion between the weight of the sediment and the weight of the sample shows percentage by weight.

The problem, however, is to determine the percentage or ratio by volume. To obtain this the ratio by weight must be divided by the specific gravity of the sediment. This is generally accepted by engineers as 1.8 or 1.9. Therefore the percentage by volume is about one half of the percentage by weight.

After knowing the mean or average amount of sediment in the stream, and also knowing the total amount of water flowing past in the stream in one second, or any fixed period of time, it is an easy arithmetical problem to determine the gross amount of sediment carried in suspension. In a large stream, such as the Mississippi, there is a considerable quantity of sand rolled along the bottom by the current. This, Generals Humphreys and Abbot, in their elaborate surveys of the Mississippi, occupying nearly ten years' time, determined roughly to be one tenth of the amount held in suspension.

The following examples will show a calculation:

A stream with 1,000 cubic feet of water per second flowing into it.

A mean sample shows that in 1,000 grains of water there are 8 grains of sediment.

8-1000 equal .008, or 8-10 of 1%.

Dividing this by 1.8-10 (specific gravity), we have 44-100% by volume.

Now, 1,000 x .0044 = 4.4 cubic feet of sediment carried past each second in suspension.

THE SUBMARINE TUNNEL BETWEEN ITALY AND SICILY.—From the project presented to the Italian Ministry, and proposed to the Venetian Society of Construction, by Signor Gabelli, the following particulars are taken: The length of the submarine tunnel between Italy and Sicily will be 44,000 feet. The maximum depth of the sea above the line of tunnel is 363 feet. The thickness of rock between the roof of the tunnel and the bottom of the sea is 115 feet. The direction of the tunnel from St. Agata to Punta del Pizzo is almost due northwest to southwest. The two inclines descending to the tunnel will first run parallel with the shore, and then descend to the lowest level by spiral tunnels. The length of these inclines is each 15,000 feet, and the area occupied by each spiral tunnel is 1,160 feet. The degree of inclination will be 35 per 1,000. The center of the tunnel will be on a higher level than the two ends. Wells and subsidiary tunnels will be constructed to drain off the percolating water, and the most difficult part of the line will be first commenced, which will at once show the geological construction of the ground and the difficulties to be overcome. According to the opinion of all geologists, the bottom of the Straits of Messina consists of crystalline rock (granite, gneiss and mica schists.)

New Species of Genus Homo.

At the meeting of the California Academy of Sciences, held on Monday evening last, Dr. H. W. Harkness presented some interesting facts of value to the world of science. He presented to the museum the lower jaw of an animal found in the sandstone of the Nevada State prison quarry at Carson. This specimen, which was in a fine state of preservation, was pronounced by Mr. C. D. Gibbs to be a species of *machairodus*, or saber-toothed tiger. The doctor called attention to the fact that Mr. Gibbs, in his report upon the Carson footprints, had referred to one series of the tracks as having evidently been made by the above mentioned animal. This is a magnificent and valuable specimen from a scientific point of view, and Dr. Harkness was fortunate in securing it for a California institution.

It was feared by scientists of the Pacific coast that upon the retirement of Mr. Garrard from the control of the Nevada State prison, all interest of the authorities in this storehouse of fossils would cease. He was happy to be able to state that such fears are unfounded, as the present warden, Mr. Frank Bell, shows the liveliest interest in all the scientific questions involved, and is eager to assist the Academy in their investigations of this most interesting discovery.

By far the most important subject brought to the attention of the Academy by Dr. Harkness was, however, his description of a new species of the genus *homo*. It will be recollected that some months since Dr. Harkness described to the Academy the fossil footprints of the Carson quarry, and submitted drawings and casts of the footprints of what was apparently a man.

The subject has attracted great attention in the scientific world at home and abroad. As to the human footprints, there was some difference of opinion among scientists. Dr. Harkness has, however, made still more careful examinations of the tracks since that time, and his later observations fully confirm his previous opinion that the tracks are those of a hitherto undescribed species of the genus *homo*. At the meeting the other night he submitted the following description of the new species:

"*HOMO NEVADENSIS*, Harkness.—Length of track, 18 1/2 inches; width at the ball of the foot, 8 inches; width of heel, 6 inches; average length of step, 27 inches; length of stride, 54 inches; width of trackway, 18 inches, as measured from the center of the sandal to the center of the corresponding one. Angle with the median line, about 15°. Each track is being modified in form by a sandal, or other protection to the foot."

Dr. Harkness also gave a name to a new species of wolf, the tracks of which are seen at the same quarry. The provisional name is *Canis Carsonicus*.

There is no doubt that this discovery will lead to still further discussion in the scientific world. A new species of the genus *homo* is not a "find" like a new plant or ordinary natural history specimen. The "Nevada Man" will attract attention all over the world. Excavations in the quarry still continue. In view of the fact that they have found the teeth of the saber-toothed tiger, the horse, and mastodon's tusk and jaw, and a horse's jaw, it is not improbable that still more interesting finds will yet be made.

OREGON AND WASHINGTON.—We are pleased to announce that our esteemed agent and correspondent, Mr. A. C. Knox, will visit Oregon and Washington Territory in the interest of our journal. Mr. Knox has had long experience in this branch of our work, and we can recommend him to all our northern friends with much confidence. We desire to give fuller information concerning the industrial progress of the northern regions of our Pacific Coast empire, and by the use of good illustrations and descriptions contribute to the commendable work of making those desirable parts of our national domain much better known. There should be a perfect reciprocity of interest and co-operation between the different States and Territories of this coast. Each can learn something from the other, and thus contribute to the general development of the country.

MINING SURVEYS.—The Commissioner of the General Land Office has ruled that the fact that a mining survey upon which is an application for patent, conflicts with a prior survey does not prevent the applicant from including the conflicting area in his application, provided no application for patent upon such previous survey has already been made. Priority of application, and not priority of survey, governs in such matters. Of course a survey must show all conflicts with any previous surveys; but the mere showing of conflict does not divest the applicant of any legal rights.

Death of Peter Cooper.

The well known philanthropist, Peter Cooper, died of pneumonia, at New York, on Wednesday last, at the ripe age of ninety-three. Perhaps Mr. Cooper was better known as the founder of the "Cooper Institute," in New York, than for anything else, although his life has been a very useful and exemplary one in many respects. He was a skilled inventor, and emphatically a self-made man. He was apprenticed to a coachmaker when seventeen, and at the end of his apprenticeship began work on an improvement in the machines for shearing cloth. When this invention took tangible shape, Cooper found that he had made his first step toward fortune, as these machines were in great demand while the importation of foreign cloth was prohibited, during our war with Great Britain, in 1812-15. Afterward he went into the manufacture of cabinetware, then into the grocery business, and finally began the manufacture of glue and isinglass, in which he amassed a handsome fortune. He was, however, at different times, engaged in other branches of business. In 1830, he built works for the manufacture of iron, and afterward a rolling and wire mill in New York, where he first successfully used hard coal in puddling iron. In 1845, he started a rolling mill in Trenton, New Jersey, where he was the first to sell beams for building purposes. He was one of the earnest promoters of telegraphic enterprises in this country, and for nearly a score of years he was President of the New York, New Foundland and London Telegraph Company. He was also among the first to become interested in that great scheme of internal navigation, the Erie canal.

Before the canal was ready for use the question of a propelling power for the boats that were to be used upon its waters began to be debated, and Cooper made an experiment of propulsion by means of an endless chain. Although abandoned at the time, his plan, under the name of the Belgian towing system, is now used on some sections of the Erie canal. Peter Cooper keenly felt the disadvantages under which he had labored when a youth in obtaining an education, and a plan for the instruction and elevation of young people of both sexes, rich and poor alike, took tangible shape in the now famous Cooper Union, the cornerstone of which was laid in 1854. In this institution which is "to be devoted forever to the union of art and science, in their application to the useful purposes of life," is afforded the amplest opportunity for education without cost. The institution now affords instruction to an average of 2,000 pupils annually. It has a school of art for women, with instruction in all branches of drawing, painting, wood engraving and photography. It also has a school of telegraphy for young women. In the evening free instruction is given in mathematics, practical engineering and practical chemistry, and free lectures are delivered in natural philosophy and the elements of chemistry. A large free reading-room and a library is open day and evening.

This library has been greatly extended in the past few years, and is a favorite resort of certain of the working classes of the great city. It has done a great deal of good. The Institute is maintained at a cost of some \$12,000 a month. Mr. Cooper has given it about a million of dollars. An inventor and manufacturer, who was at the same time a philanthropist and a millionaire, could do vast good with his money, and Mr. Cooper did it. His memory will always be kept green by the thousands he has benefited.

Peter Cooper was nominated by the National Greenback party for President in 1876, and received 81,740 votes. He leaves two children—Edward Cooper, formerly Mayor of New York, and Mrs. Hewitt, wife of Congressman Abram S. Hewitt.

BETTER CARS FOR IMMIGRANTS.—The California Immigration Association is inaugurating a new plan throughout the States of the west where the severe winters have a tendency to induce farmers of some means to seek homes in warmer climes. Their efforts are being seconded by the railroad companies, who have made concessions in fares, and as an inducement for the organization of companies to start from a given center, such as Council Bluffs and Denver, the Association has made arrangements to have the improved immigration cars furnished with carpets and curtains, making them very comfortable for the overland trip. The first installment will arrive shortly.

THERE WERE 1,342 immigrants arrived by the two overland routes during the past week. Only 269 of these were in transit, their destination being British Columbia. A settlement of about fifty French families who had been induced to immigrate to Canada, and who are disappointed, have, upon applying for information to the manager of Castle Garden, been referred to the Immigration Association of this State, and are expected to come here this spring.

THE President has asked the Civil Service Commissioners to visit New York to inspect the Postoffice and Custom House there before submitting their new rules to him. The women clerks are quite enthusiastic, as they are advised that, under a proper construction of the Civil Service act, there will be no distinction in sex in recommendations for admission or promotion.

Fresh Water Pearl Mussels.

[Written for the Press by ROBERT E. C. STARNES.]

Almost everybody who has lived in the country in the neighborhood of lakes, ponds, brooks and rivers, has seen fresh water mussels, for they are a common form of bivalve shell fish in such places. There are two principal groups of these—one with usually solid shells, with interlocking projections in each valve, which are termed hinge teeth; the other with rather thin shells, which are destitute of hinge teeth. The first, with hinge teeth, are called *Unios*; the last, *Anodons*. The word *Unio* means "a pearl"; the word *Anodon* means "without teeth." These are the principal groups which constitute the family *Unionidae*. The inside of the valves, as the two pieces which form the shell are called, is lined with pearl. Sometimes this lining is pink, again white, yellowish, or orange, and more or less translucent.

It is quite frequently the case, that the soft mantle of the animal contains the round or oval pearls used for jewelry, and fine or seed pearls are quite common in such shells as live in streams where the water is silty, or carries sediment part of the year. A grain of sand gets lodged in the soft mantle of the mollusk, and causes irritation, the same as a speck of hard matter is painful in the human eye; this causes the mussel to cover the grit with a coating of mucus, which hardens upon the outside of the speck, and gives it a smooth, pearly surface. All pearls are produced in this way, and many bivalve mollusks, both fresh water and marine, contain these concretions. At one time, the gathering of fresh water mussels for the pearls contained in them was an extensive occupation in Britain; the streams were systematically searched, and the business profitable; for a long time, however, it has ceased to be remunerative.

Some historians state that one inducement to the invasion of Britain by Julius Cesar was the alleged great value of the pearl fisheries; so, also, with the invasion and conquest of Florida by De Soto. The narratives of the old Spanish explorers and adventurers contain exaggerated accounts of the size and abundance of pearls in the hands of the American aborigines, and even recent historians have given more or less credit to the glowing accounts and ridiculous fables of the old Spanish soldiers and chroniclers. Undoubtedly many and oftentimes valuable pearls are found in the fresh water mussels which abound in the tributary streams of the Mississippi and other southern and northern water courses which drain into the Mississippi basin, but "bushels of pearls" as has been related as seen in the possession of the Indians by the Spanish soldiers of De Soto's time is simply an absurdity. What they really did see was probably the smooth, shining shells of a species of *Marginella*, which are pearl-shaped and of the size of large pearls. These are quite common, and have been found in quantities in many cases in old burial mounds in the Mississippi valley and around the Gulf of Mexico, where these shells live. Some idea of the number of species of the river and pond mussels may be formed by the figures of Dr. Isaac Lea, of Philadelphia, who has made these forms an especial study for a great many years. In Dr. Lea's "Synopsis of the Family of Unionidae," 1870, he says: "In the following tables there will be found in the family 1,069 recent species as admitted, 224 unknown to me or doubtful, and 183 fossil; in all, 1,476; and the synonymy, according to my views, is enormous, being 891." Of this large number, nearly 700 of the family are credited to North America, inclusive of Mexico.

Regarding the fresh water mussels, the late Philip Carpenter wrote: "As far as shells are concerned, this family forms the special glory of North America, and especially of the drainage area of the Mississippi. The American *Unios* are the most numerous, the most remarkable, and the most beautiful that are found in any portion of the globe. There is a special reason for this provision. In no other known portion of the earth is there so large an area covered with soluble limestone. The waters of the rivers being saturated with this would be unfit for many of its uses, were it not for the immense development of this group of heavy shells. The North American *Unios* may be regarded as so many water filters absorbing the lime from the water, and preserving it from re-absorption by their strong, horny skins. The muskrats also play an important part in this economy, being nature's great *Unio* fishers. They bring them up out of the streams, and leave the shells in heaps on the banks."

In the foregoing we get some idea of the position and importance of the fresh water mussels, as related to the molluscan fauna of North America, a glimpse at the part they play, the kind of work they perform in the grand economy of nature, and a momentary glance at the complementary and compensative methods and implements through and by means of which the processes of nature are performed.

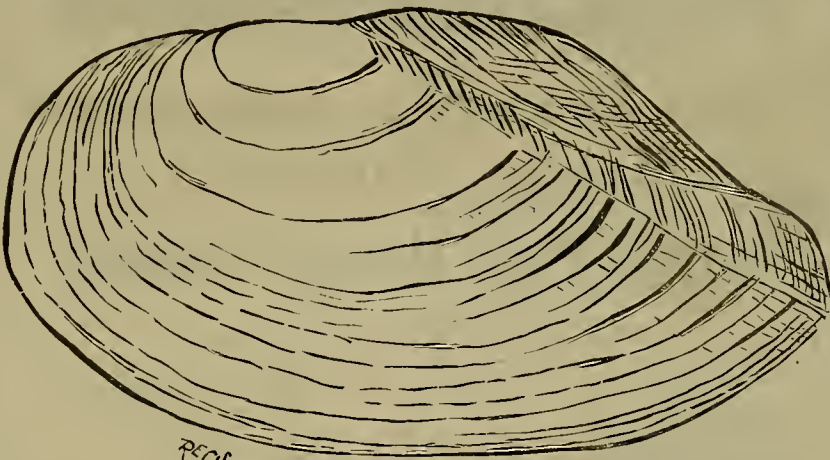
There are four or five so-called species in California, Oregon, etc., and one ever so far north, at the Yukon river, in Alaska, where they are eaten by the natives; the California aborigines also used them for food, and in the Klamath river country large heaps of the empty shells may be seen on the banks, the Kitchen-middens, or refuse of ancient feasts and festi-

vals; so in other parts of the State. Similar heaps are found in the southern and western States; the remains of fresh water clam bakes which have almost outlasted the race and the tribes who participated on such occasions. The shells of some of the species are used in the arts, and buttons and various trinkets are made from them, but the true mother-of-pearl shell has the long and poetical name of *Margaritifera margaritifera*, from *Margaret*, a pearl, and *fero*, to bear; namely, the pearl bearer. This is a marine shell, found only in salt water, and in the seas of warm climates, like the Gulf of California, the Bay of Panama, among the South Sea Islands, and Southern India, Australia, also the Persian Gulf, etc.

While the shells of the fresh water mussels are quite distinct, the anatomy or soft parts—that is to say the animal—is very much like that of the salt water mussels which are so abundant on nearly every sea coast, where the shells may be seen attached to rocks; seaweeds, also, to the woodwork of wharves, particularly to the piles of such structures, and upon old wrecks. These sometimes contain small pearls, but they are dark colored and of no value. Like their fresh water relatives, these also are used for human food, and are eaten by both whites and Indians.

Rapid Tunnel Work.

It will be remembered that we gave, some little time since, a description of the Big Bend tunnel, Butte county, in this State, which is designed to take large body of water, in order that the miners may get at some rich ground in the "Big Bend" of the Feather river. The tunnel is sixteen feet wide and twelve feet high. Operations are being rapidly pushed at the tunnel, and the work done there lately has been very remarkable in point of speed. They are



ANODONTA CYGNEA, OR SWAN MUSSEL.

using a No. 4 compressor Burleigh, and four tunnel drills, or Burleigh carriage.

The following is the report of work on the Big Bend tunnel for the month of February, 1883.

Total number of holes drilled.....	939
Total depth of holes drilled.....	5,097 ft
Average depth of holes.....	5.6 ft
Time used in drilling.....	124 hrs. 30 min
Average time of drilling, per shaft.....	1 hr. 32 min
Number of working shafts for month.....	31
Drills sharpened.....	672
Carloads of rock removed.....	3,306
No. 1 Giant Powder used.....	2,650 lbs
No. 2 Giant Powder used.....	50 lbs

Total tunnel built to Jan. 1.....	390 ft
Total tunnel built in Jan. 1883.....	355 ft
Total tunnel built in Feb. 1883.....	293 ft

Total tunnel completed to Mar. 1, 1883, 1,047 ft.

Up to March 22d they cut 232 feet more, making a total of 1,279 feet built to March 22d. The last week in March they cut 118 feet, or a total of 350 feet in the month.

March order for the Big Bend tunnel machinery was given to Parke & Lacy of this city. They guaranteed the company that with the machinery offered the rate of progress in this large tunnel would be 250 feet a month from one heading. How much better has been done can be seen. We do not know that any tunnel on this coast in the same kind of hard rock has been driven at any such rate of speed. Messrs. Parke & Lacy were confident, however, that their machinery would do the work. They are able now to furnish either the Burleigh Air Compressors and Rock Drills or the Ingersoll Compressors and Rock Drills. The improved diamond prospecting drills now being introduced are sold without any restriction.

FRANK A. HILL, the well known inventor and patentee of agricultural implements in this State, having retired from the management of the Agricultural Works, at Benicia, is about to organize a company to build and work a new system of steam plowing, which, he believes, will revolutionize this class of work.

Early History of The Comstock.

[Written for the Press by ALMARIN B. PAUL.]

I note in your issue of Feb. 24th, and also in that of March 17th, observations on the early history of the Comstock, which, unintentionally, are not strictly correct. Mr. Chas. Schuchard says:

"It was in the spring of 1858 when Comstock presented to Maj. K. Allen, then Quartermaster General, in his office in San Francisco, a piece of black ore from Washoe. Mr. Allen showed the ore—the same—to Mr. Killalee." This is certainly a mistake, as far as Comstock is concerned, in two respects. First, Comstock knew nothing of the black ore until Stone, sent over by Harrison to Nevada, California, some of the "black stuff" for Comstock to see what it was, and had reported to him. This was in June, 1859; second, Comstock did not visit San Francisco until after he sold his interest, in December (I think it was), 1859. Again, Mr. S. says: "Killalee took the specimens to his office, and there made the assays. Shortly after, I learned Mr. Killalee was dead." Richard G. Killalee I was personally acquainted with; he died July 29th, 1859. Mr. S. is out of his reckoning, I think he will admit, just about one year. I will prove this fact further, as he says, "If I recollect right (which he don't), you may find some notes on this in Mr. Blake's *Mining Magazine*, published at that time."

Now for Prof. Blake and his *Mining Magazine*. In the article of Prof. Blake's in the *MINING AND SCIENTIFIC PRESS* of March 17th, 1883, he says:

Mr. Charles Schuchard, in his interesting communication (page 126), refers to some notes on the discovery of the silver ore of the Comstock lode, which he thinks were published in the *Mining Magazine*. He is correct in this reference. One of the first notices of the discovery (if not the first), outside of the notices in the daily newspapers of that time, appeared in the *Mining Magazine* for January, 1860, (second series, vol. 1, page 221). A short notice appeared also in the number for De-

So much for that subject, now I claim to be the first individual who gave notice through the public prints of the discovery. It was published in the *San Francisco Bulletin*, July 2 or 3, 1859, and was as follows:

Rich Gold Discoveries in the North.

[From our Nevada Correspondent.]

NEVADA, June 30, 1859.

There is considerable of a stir, hereabouts, concerning a great discovery up north, say sixty miles above Nevada. Many are leaving hourly. A party started from here last night about twelve o'clock, in order to overtake and head a preceding one. The account is that a lead has been discovered which can be traced for six miles, and all of it rich with gold and silver, and, by assay, will pay \$1,000 per ton. I have seen some of the specimens which look exceedingly rich for silver. It assays well, but whether the material as a whole will pay ten per cent, on what it is purported to yield, is a question yet to be determined. I need not say that it should not stir the equilibrium of your population. Several of my friends are on the road to fortune and if it is anything of importance, I will soon inform you of the fact.—COSMOS.

The succeeding letter gave more news, and was as follows,—to same paper:

JULY 8, 1859.

Agreeably to promise I forward the latest intelligence from the gold hunters of Washoe valley. Since the first company started, some weeks ago, companies of two and more have been departing, nightly as well as daily. A party has just returned, and have answered the question of "What's the news from Truckee?" which for some days past has been the leading question. It appears that in this excitement there is something substantial to back it. My informant states that there is plenty of gold and silver; that the few who have water to work are making several hundred dollars a day, and that a miner over there, in speaking of his claim said, "I only had water I believe I could fill my sluice half full of amalgam of gold and silver."

Two other letters were written to the *Bulletin*, bearing dates July 10, 1859, and July 17, 1859, and at different times up to October 16, 1859, from which letter I extract the following, which now has some interest.

OCTOBER 16, 1859.

The accounts first given were no doubt, deemed exaggerations but unlike other discoveries half was not told. Were I to transcribe the lines before me, respecting the value per ton, the estimated richness of the lead, the amount of money "in sight," you would say my correspondent (Geo. Hearst) was crazy, and myself not much saner. Prudence therefore dictates a more moderate recital, I think it is safe to say, however, that the two mines now being worked, have not ther equal in wealth and for the quantity of ore, on the globe. You will know of tons of silver and gold leaving here per month.

Thus, Mr. Editor, your correspondents have brought forth a little more data of the early history of that wonderful lode, the Comstock. Some philosophers say information is wealth. I certainly had information of great value soon enough to have reaped millions piled on millions. It was not my turn then. I have never sighed over it.

JOHN McAVIN, Jr., was killed at the Alaska, mine, Pike City, Sierra county, last week. He went down the shaft to repair the pump. The shaft is a three

compartment one, the cages being so arranged that while one is going down another is coming up. After McAvin had been below a few minutes the bell rang to hoist and the engineer started the cage on its upward journey. The cable had made but a few coils around the reel when the engineer noticed a sudden jarring and quivering of the rope which led him to suppose that something was wrong. He immediately stopped the cage and waited for another signal from the shaft. Not receiving the expected signal he hoisted the cage out of the mine, but seeing no one on it he at once summoned one of the other employees at the mine and lowered him into the shaft to ascertain what the difficulty was. When the opposite cage arrived at the surface it bore on it the almost lifeless body of the unfortunate young man.

MINERAL SPRINGS.—Secretary Teller, in the Pagosa Springs case, says: Many springs and many waters are impregnated with minerals held in solution; but it does not follow that the lands bearing such waters are mineral lands, and can be patented as such. Lands of a saline character are an exception, and are expressly provided for in the laws relating to the disposition of the public lands. Lands containing mineral springs not of a saline character are subject to sale under the general laws, and not under the acts relating to the sale of mineral lands.

A new camp has been struck by some prospectors from Calico, about 100 miles off in Inyo county. The camp is in Death Valley, on the edge of the Panamint range of mountains, and about forty miles from Panamint. Miners are already leaving Calico for that place, from which ore brought in assays \$386 in silver, and carries seventeen per cent. lead.

J. M. PASCOE writes from Calico district, California, to James Tickle, of Eureka, that miners' wages are \$3.50. Those who can lease mines are making money.

From March 7 to August 29, 1882, the Richmond Consolidated mine smelted 12,093 tons ore, yielding \$16,000, or a monthly average of \$102,000.

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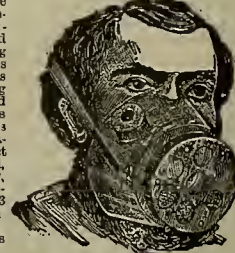
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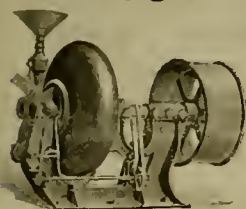
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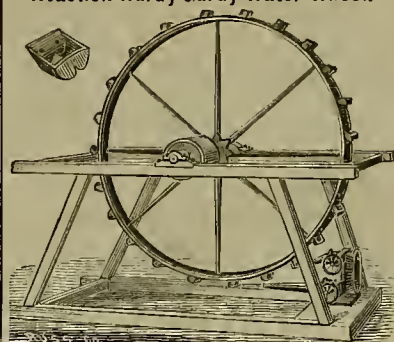
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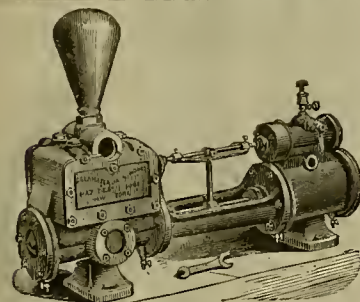
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS Patent Agency, 252 Market St., S. F.

WEEK ENDING MARCH 27, 1883.

274,724.—PLUG STOP VALVE.—L. D. Craig, S. F.
274,725.—REVOLVING WATER CLOSET STENCH TRAP.—L. D. Craig, S. F.
274,730.—SEAM FOR GRAIN BAGS.—E. Detrick, S. F.
274,737.—HARNES COUPLING.—A. P. Gross, S. F.
274,737.—SAFETY VALVE.—A. D. Kilborn, Tucson, A. T.
274,505.—UNDERGROUND CABLE RAILROAD.—A. H. Lighthall, S. F.
274,506.—GRIPPER FOR TRACTION CABLES.—A. H. Lighthall, S. F.
274,501.—SURCINGLE.—Maltby & Sabine, Chico, Cal.
274,423.—SKETCHER'S EASEL.—Mary A. Merrill, S. F.
274,635.—RAILWAY SAFETY ALARM.—W. B. Morris, S. F.
274,643.—RAILWAY SWITCH.—Jos. Murphy, San Jose, Cal.
274,648.—BRIDLE BIT.—M. J. O'Leary, Springfield, Cal.
274,600.—OBTAINING BORACIC ACID FROM BORATES.—W. B. Robertson, Jr., S. F.
274,523.—CORD CRASPER AND CUTTER FOR GRAIN BINDERS.—A. Savage, Salem, Oregon.
274,689.—SCREW CLAMP FOR STOOLS.—A. Waugeman, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

NIPPERS FOR PILE DRIVERS.—Samuel Hadlock, Port Townsend, W. T. No. 274,189. Dated March 20, 1883. This improvement in nippers for pile drivers consists in a centrally hinged strut brace, pivoted at both ends, to and between the sides of the nippers, whereby said sides are held extended, to hold the jaws to their grip, and in a means for bending said brace centrally, to draw in, directly or indirectly, the sides to extend the jaws. It further consists in a peculiar extensible frame, constituting the nippers, in which said brace acts to the best advantage, and in a novel means for tripping the nippers. The object is to provide nippers which will effectively seize and sustain the weight, and will release it with certainty when desired, without the necessity of having one operator go upon the scaffold above. The common form of nippers is not certain in its action. Its jaws cannot be greased, on account of slipping, and consequently they have often to be pried off by an operator at the top of the machine. To constitute effective nippers, they should be certain in their grip, and readily disengaged.

COMBINED CUTTING, PUNCHING, AND TIRE-UPSETTING MACHINE.—Harris Morse, Tuttle-town, Tolueme county, Cal. No. 274,216. Dated March 20, 1883. This invention relates to a novel apparatus for use in blacksmiths' and other iron-working shops, and it consists in a combination within a single frame, of a tire-upsetting device, a cutting or shearing, and a punching device, and a drill-sharpening device. The whole of these devices are actuated by an oscillating or rocking shaft forming a double lever, and having movable boxes, by which it may be elevated or depressed. In combination with this movable shaft, the inventor employs a wedge-shaped sliding base, with rack and pinion for moving the same, so that the fulcrum may be raised or lowered, and thick plates cut or punched by successive movements.

RAILWAY SAFETY ALARM.—Wm. B. Morris, S. F. No. 274,635. Dated March 27, 1883. This safety alarm for railways consists in the arrangement of a series of levers at intervals in the section of a single track and normally held horizontally, tripping devices at each end of the series for releasing the levers and causing them to be elevated in the track, and devices on approaching locomotives for operating the tripping mechanism to raise the levers for subsequently depressing and re-adjusting them, and for coming in contact therewith while raised, to give warning. The object of the invention is to provide against the danger of collision upon section of single track, by giving notice at the further end of said section that a train has entered the other end.

SCREW CLAMP FOR STOOLS.—Randolph Waugeman, S. F. No. 274,680. Dated March 27, 1883. This clamp is intended to be put on screws of vertically-adjustable stools, chairs, etc., the object of which is to hold the screw tightly in the socket to prevent the side play or looseness, which is always attendant upon devices of this character. The invention consists in a wedge sleeve encircling the screw, which, either by its own weight, or by the downward pressure of the screw itself, is adapted to be depressed sufficiently in the standard and bind upon and clamp the screw so that it can not have any side play.

BOX FASTENER.—Stephen and Martin E. Martinelli, Watsonville, Cal. No. 273,863. Dated March 13, 1883. This improvement in packing boxes consists in the means of readily securing the cover to the box in such a manner that it may easily be removed without injuring the cover of the box.

PHYSICIANS say it combines all the desiderata of every ferruginous tonic prescribed by every school of medicine. Brown's Iron Bitters.

News in Brief.

THE President has gone on a short trip to Florida.

JOHN BROWN, the famous Scotch body-servant of Queen Victoria is dead.

THE coinage at the Philadelphia Mint in March aggregated 6,687,752 pieces, valued at \$1,114,073.

SOUTHERN UTAH is reported as having but little snow in the mountains, while the valleys are very dry.

WHEN the total losses by recent floods in the Ohio and Mississippi valleys have been approximated, \$30,000,000 will hardly cover it.

THE British returns for the financial year ending March 31st show that the revenue of Great Britain was £89,004,000; expenditures, £89,086,000.

FOR the past three months the importation of foreign dry goods at the port of New York amounted to \$39,404,403, against \$40,528,195 for the corresponding three months last year.

ONE hundred and fifty thousand acres have been sown to wheat and barley in Los Angeles, and there is a promise that the exportation of 1880 (11,000 tons of wheat) will be doubled, says the *Herald*.

THE Missouri Legislature has passed a bill providing that no railroad company in that State shall advance freights without giving twenty days' notice of the proposed change by posting the new schedule in three conspicuous places in each of its freight and passenger depots.

JOHN S. ENOS, Superintendent of the new Bureau of Labor Statistics, and his assistant, Hugh J. Mahon, have engaged rooms over the City of Paris, at the corner of Dupont and Geary streets, where they can be found between the hours of 9 A. M. and 5 P. M. each day. As the office is one of great importance to the laboring and mechanic portion of the community, it will require some time before the commissioners will be able to do anything practical, calculated to enlighten the masses on the relative rate of wages in the different parts of the country, etc.

PLAIN TRUTHS

The blood is the foundation of life, it circulates through every part of the body, and unless it is pure and rich, good health is impossible. If disease has entered the system the *only* sure and quick way to drive it out is to purify and enrich the blood.

These simple facts are well known, and the highest medical authorities agree that *nothing* but iron will restore the blood to its natural condition; and also that all the iron preparations hitherto made blacken the teeth, cause headache, and are otherwise injurious.

BROWN'S IRON BITTERS will thoroughly and quickly assimilate with the blood, purifying and strengthening it, and thus drive disease from any part of the system, and it will *not* blacken the teeth, cause headache or constipation, and is positively *not* injurious.

Saved his Child.

17 N. Eutaw St., Baltimore, Md.
Feb. 12, 1880.

Gents:—Upon the recommendation of a friend I tried Brown's IRON BITTERS as a tonic and restorative for my daughter, whom I was thoroughly convinced was wasting away with Consumption. Having lost three daughters by the terrible disease, under the care of eminent physicians, I was loth to believe that anything could arrest the progress of the disease, but, to my great surprise, before my daughter had taken one bottle of Brown's IRON BITTERS, she began to mend and now is quite restored to former health. A fifth daughter began to show signs of Consumption, and when the physician was consulted he quickly said, "Tonics were required," and when informed that the elder sister was taking Brown's IRON BITTERS, responded "that is a good tonic, take it."

ADORAM PHELPS.

BROWN'S IRON BITTERS effectually cures Dyspepsia, Indigestion and Weakness, and renders the greatest relief and benefit to persons suffering from such wasting diseases as Consumption, Kidney Complaints, etc.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That is this understood and appreciated is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First St., a Rutherford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. References as to above can be had upon applying to this office.

Cash in Advance.

Our terms are cash in advance for this paper. NEW NAMES will not be entered on our printed list until payment is made. Feb. 1, 1883.

THE ALBANY CYLINDER OIL

Has its globule undisturbed, stands a fire test of more than 500 degrees, is perfectly free from acids or oxygen, clings with more tenacity to the metal, and better resists the great pressure and heat of steam than any other lubricant.

LARGEST STOCK OF

GENUINE EASTERN OILS

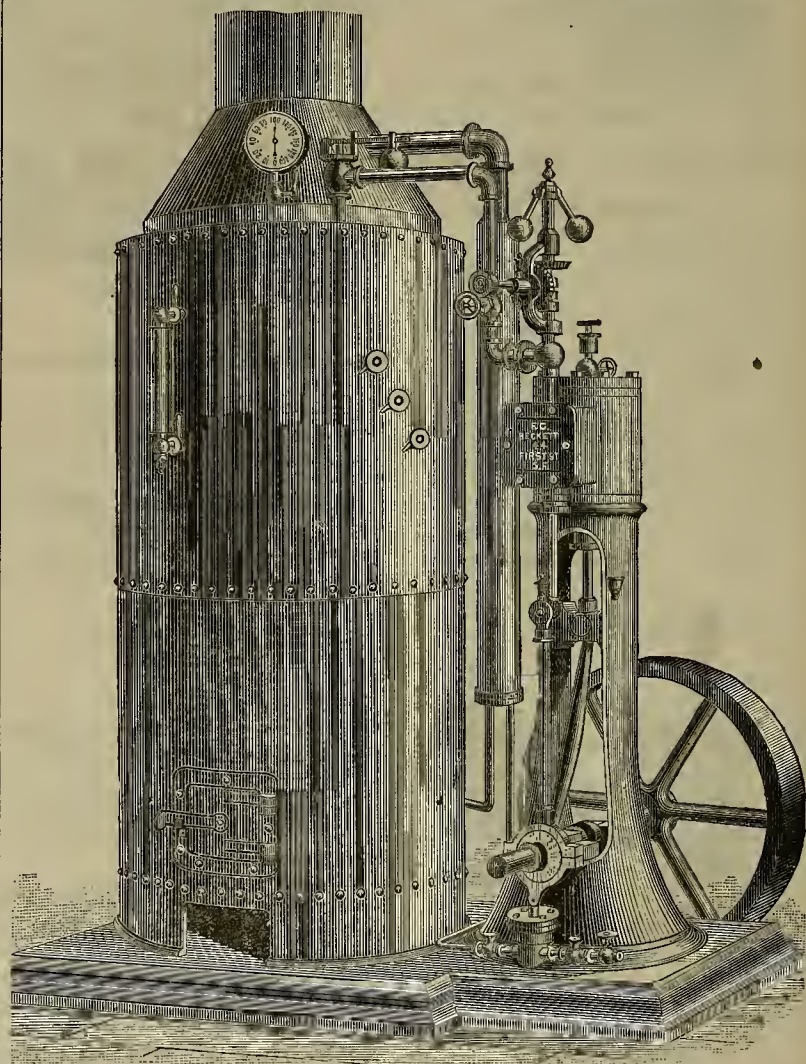
In this City.

HEADQUARTERS

—FOR THE—

Albany Lubricating Compound
TATUM & BOWEN,

25, 27, 29 and 31 Main St., San Francisco.
187 FRONT ST., PORTLAND.



F. G. BECKETT,

Manufacturer of

VERTICAL AND HORIZONTAL ENGINES AND BOILERS,

FROM 2 TO 90-HORSE POWER.

Improved Hoisting Engines, Engines for steam Yachts. Engines for pumping artesian wells and irrigating and farming purposes, and all kinds of Machinery.

Repairing Promptly Attended to.

No. 44 FIRST STREET, SAN FRANCISCO, CAL.

WELLS' PATENT CAST METAL UNBREAKABLE LAMPS AND OIL FEEDERS.

A. C. WELLS & CO., Patentees,
Market St. Manchester, Eng.

OVER

150,000

Cast in first two years, superseding all others. Ask your Furnisher to get you them.

WRITE FOR LISTS.

Agents wanted in all parts. Liberal Terms.

Entirely superseding tin goods, as they Don't Leak or Break!

In writing please mention this paper.

Sole Wholesale Agents for the United States,
FAIRBANK, DIEHL CO., 140 Chestnut Street, Philadelphia, Pa.

"Challenge" Ore Feeders.

OVER 1100 HAVE BEEN IN SUCCESSFUL OPERATION.

Awarded First Premiums at the Preceding and last Industrial Fairs of the Mechanics' Institute of San Francisco.

TWENTY PER CENT. MORE ORE CRUSHED WITH FIFTEEN PER CENT. LESS WEAR OF IRON THAN BY THE OLD METHOD OF HAND-FEEDING.

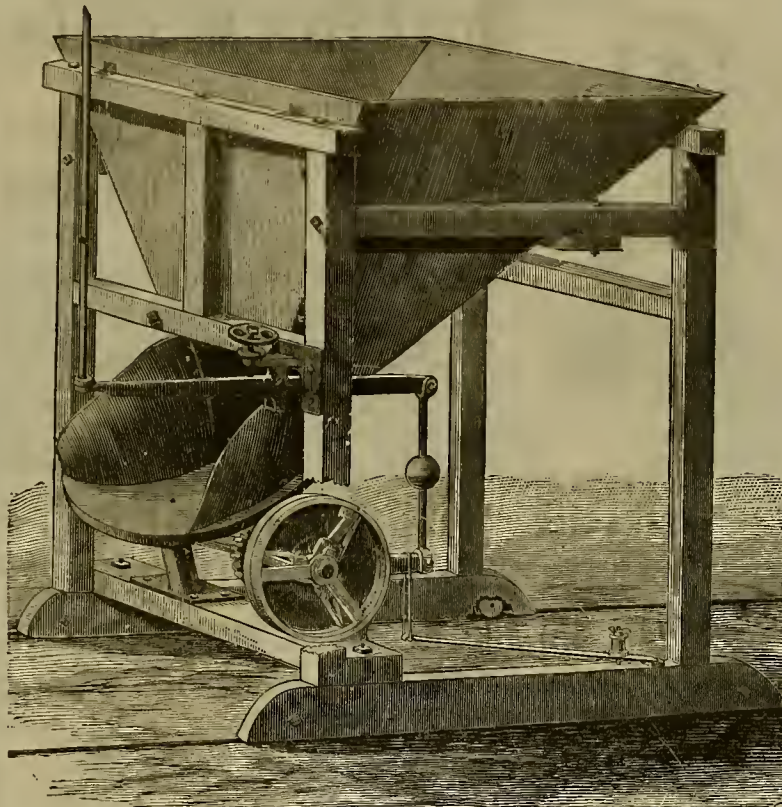
The opposite cut illustrates the recently introduced G. P. and Spring Attachment, which replaces the Weight originally used, and result in an obvious improvement.

The practical operation of the large number of these machines now in use demonstrates the fact that the machine upon which a perfect Ore Feeder may be constructed is that of a carrier and not that of a weighing table. Uniform feeding is not possible upon the latter plan. The ore must be evenly carried upon a steady advancing plate or table to the line or point of discharge, and there be simply dropped. Jerky or spasmodically acting conveyances will not answer the purpose for feeding wet or sticky ores, nor for the ores of mines where they may change from sharp quartz to an iron ore material of quartz and iron ore matter.

The Ore Feeders are in Successful Practical Operation in the Following Quartz Mills, and are giving Perfect Satisfaction to their Managers.

Comprehensive	10	Stamps	Variposa county, Cal.
Soulby	21	"	Tuolumne " "
Patterson	21	"	" " "
Sheep Ranch	20	"	Calaveras " "
Mahoney	10	"	Amador " "
Z. H.	19	"	" " "
Pacific	40	"	" " "
Nashville	21	"	El Dorado " "
Orocas	20	"	" " "
Julian	20	"	Pierce " "
St. Patrick	15	"	Nevada " "
Providence	40	"	" " "
Emery	20	"	" " "
Idaho	30	"	" " "
Green Mountain	60	"	Plumas " "
Plumas-Eureka	60	"	" " "
Bulwer-Standard	30	"	Bodie, Mono, " "
Standard	30	"	" " "
Nevada	30	"	" " "
Big Dry Creek	10	"	Franklin " "
Mexican	41	"	Lyon county, Nevada.
Santiago	32	"	" " "
Vivian	16	"	" " "
Christy	5	"	Utah, county, Utah.
Contention	20	"	Tombstone, Arizona.
Grand Central	20	"	" " "
Sunshine	20	"	Black Hills, Dakota.
Homestead	200	"	" " "
Father de Smet	50	"	" " "
Hidden Treasure	40	"	" " "
Higbland	120	"	" " "

And in many other Mills in the Mining Districts of the entire United States, and as well in Nova Scotia and Australasia. The superiority of these Feeders over others manufactured has been so thoroughly demonstrated that it is not deemed pertinent to cite the numberless instances of this fact.



Manufactured and for Sale by

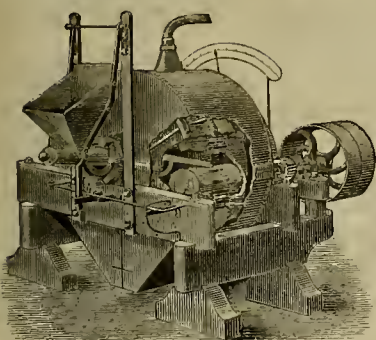
THE "JOSHUA HENDY MACHINE WORKS,"

Nos. 49 and 51 Fremont Street, San Francisco, Cal.,

Manufacturers of Quartz, Saw Mill and General Machinery. Agents for "BAKER" ROTARY PRESSURE BLOWERS, WILBRAHAM ROTARY PISTON PUMPS, P. BLAISDELL & CO.'S MACHINISTS' TOOLS, and the Celebrated "HOT POLISHED SHAFTING," from the Akron Iron Company, Akron, Ohio. Also Manufacturers of New and Dealers in Second-Hand Boilers, Engines and all Descriptions of Machinery.

CATALOGUE AND PARTICULARS FURNISHED UPON APPLICATION.

Tustin's Pulverizer WORKS ORE WET OR DRY



MANUFACTURED AT

The Tustin Windmill Horse-power and Pumping Machine Works.
308 Mission Street, S. F., Cal.
By W. I. TUSTIN, Inventor and Patentee.

H. H. BROMLEY,

Dealer in Leonard & Ellis Celebrated

TRADE MARK

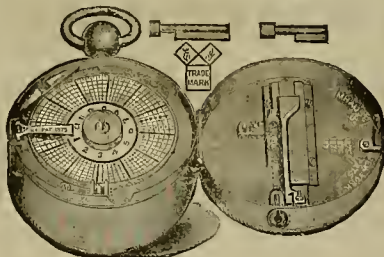
VALVOLINE
STEAM CYLINDER AND MACHINE OILS,
The Best and Cheapest.

These Superior Oils cannot be purchased through dealer and are sold direct to consumer only by H. H. BROMLEY sole dealer in these goods.
Reference—Any first-class Engine or Machine Builder in America. Address, 43 Sacramento St., S. F.

Dewey & Co. { 262 Market Street } Patent Agts

IMHAUSER'S

Watchman's Improved Time Detector,
WITH SAFETY LOCK ATTACHMENT.



(Patented 1875-6-7-80-81.)

Beware of imitations. This instrument is supplied with 12 keys for 12 stations. Invaluable for all concerns employing night watchmen. Send for Circulars to

DUNHAM, CARRIGAN & CO.,

San Francisco, - - - California

QUICKSILVER.

THE CELEBRATED A BRAND.

Shipped Direct from the New Almaden Mine,
New Almaden, Santa Clara Co., Cal.

For sale in any quantity. Trade-mark A on top of Flasks secured by United States Patent, and registered. Flasks contain 7 1/2 lbs. Quicksilver. Weight and purity guaranteed.

CARLOAD LOTS will be shipped from San Jose, Cal., for Nevada, Arizona, New Mexico, Montana and Idaho or Utah, or delivered at Pacific Mail Steamship Co.'s wharf, and Depot of S. P. R. R. Co., San Francisco, without charge. Railroad rates from San Jose are the same as from San Francisco.

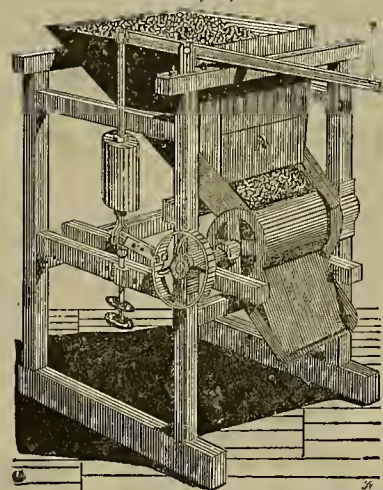
J. B. RANDOL,

P. O. Box, 1072. 320 Sansome Street, S. F.

LAND
Good land that will raise a crop every year. Over 12,000 acres for sale in lots to suit. Climate healthy. No drouths, had floods, nor malaria. Wood and water convenient. U. S. Title, perfect. Send stamp for illustrated circular, to EDWARD FRISBIE, Proprietor of Reading Ranch, Anderson, Shasta County, Cal.

THE ROLLER ORE FEEDER.

Patented May 28, 1882.



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery, as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

Golden State and Miners' Iron Works,
Sole Manufacturers,
337 First Street, SAN FRANCISCO, CAL.

FINE WOOD PHOTO-ENGRAVING
SEND COPY FOR ESTIMATE. CROSSCUP & WEST.
IT WILL PAY YOU 702 CHESTNUT PHILADELPHIA

How to STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company.

San Francisco, March 24, 1883

At a meeting of the Board of Directors of the above-named company, held this day, Dividend No. 17, of Five Cents (5c) per share, was declared, payable on Thursday, April 12, 1883. Transfer books closed on Monday, April 2, 1883, at 3 o'clock, p. m. This dividend is payable at the Farmers' Loan and Trust Company in New York, on all stock issued there, and at the office in this city on all stock issued here.

W. M. WILLIS, Secretary.

OFFICE—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

NOTICE OF THE APPLICATION

—OF THE—

South Comstock Gold & Silver Mining Co.

For Dissolution and Reincorporation.

Notice is hereby given that the South Comstock Gold and Silver Mining Company has this day filed with the Clerk of the Superior Court, of the City and County of San Francisco, an application for Dissolution and Reincorporation, and all persons desiring to file objections to such application are hereby notified to file such objections within thirty days after the first publication of this Notice.

March 8, 1883. WILLIAM T. SESNON, Clerk.
Date of first publication,) O. Z. SOULE,
March 16, 1883.) Deputy Clerk.
WHITE MORE & McKEE, Attorneys for Petitioners.*

DIVIDEND NOTICE.

OFFICE OF THE

Navajo Mining Company.

San Francisco, April 2, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 8, of Twenty-five Cents (25c) per share, was declared, payable on FRIDAY, April 13, 1883. Transfer books closed on Saturday, April 7, 1883, at 12 o'clock m.

J. W. FEW, Secretary.

OFFICE—Room 15, No. 310 Pine street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, April 2, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 53, of Twenty-five Cents (25c) per share, was declared, payable on THURSDAY, April 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

W. M. WILLIS, Secretary.

OFFICE—Room No. 29 Nevada Block, No. 309 Montgomery street, San Francisco, California.

Buchanan Gold Mining and Milling Company. Location of principal place of business, San Francisco, Cal.; location of works, Tuolumne, Tuolumne county, Cal.

Notice is hereby given that, at a meeting of the Board of Directors, held on the 31st day of March, 1883, an Assessment (No. 2) of Five (5) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in United States gold coin, to the Secretary at the office of the Company, room 3, No. 121 Post street, San Francisco. Any stock upon which this Assessment shall remain unpaid on the 24th day of May, 1883, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, June 1, 1883, to pay Delinquent Assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, P. J. SULLIVAN, Secretary.

OFFICE—Room 3, 121 Post Street, San Francisco, Cal.

NOTICE TO CONTRACTORS.

Sealed proposals will be received by the Brandy City Mining Company until May 1, 1883, to run a bedrock tunnel to its mining lands, situated at Brandy City, Sierra County, Cal., near the town of Camptonville, Yuba County. Said Tunnel to be about 3,000 feet long, 6 feet wide and 8 feet high, with a grade of 5 inches to every 12 feet. Water Power furnished. Responsible parties only need apply. Privilege reserved to reject any and all bids. For further particulars inquire of

CHAS. ALLENBERG, Sec'y.,

630 Brannan Street, San Francisco, Cal.

Only "PEBBLE" Establishment.

1861 1883
Muller's Optical Depot,
185 Montgomery St. near Bush.

SPECIALTY FOR 33 YEARS.

The most complicated cases of defect in vision thoroughly diagnosed, free of charge. Orders by mail or express promptly attended to.

Compound Astigmatic Lenses Mounted to Order. Two Hours Notice.

NATIONAL COMPRESSORS and ROCK DRILLS.

EDWARD A. RIX, Agent,

47 and 49 Fremont Street,

San Francisco, Cal.

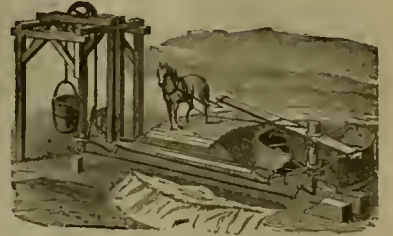
IRON AND STEEL WIRE HOISTING ROPES.

ORE
CARS.



HORIZONTAL AND VERTICAL ENGINES
1 to 100 Horse Power.

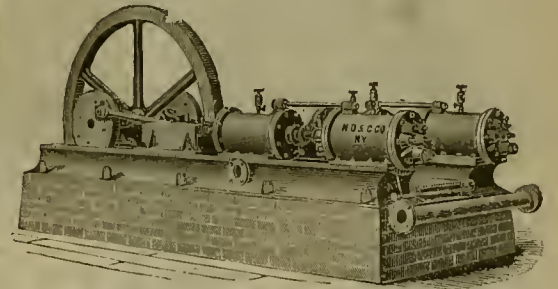
ORE AND
Water Buckets.
BELT
Compressors.



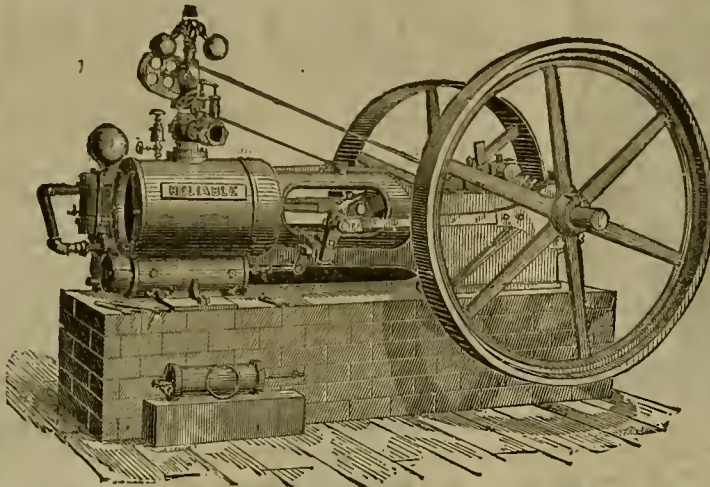
MINERS' HORSE-WHIM

One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The whim is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of the whim is bolted to bed-timbers, thus avoiding all frame work. When required these whims are made in sections to pack on mules.

NATIONAL DUPLEX COMPRESSOR.



KNIGHT'S
Mining Water Wheel.
OVER 200 IN USE IN CAL.



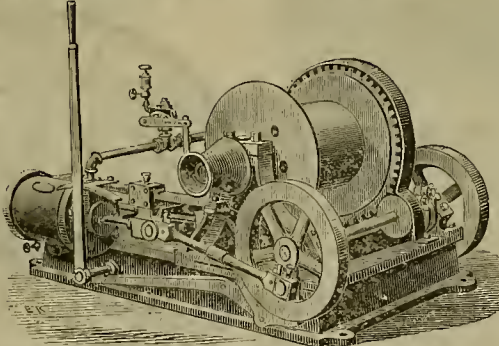
PACIFIC MACHINERY DEPOT.

H. P. GREGORY & CO.,

Importers and Dealers in Machinery and Supplies.
Nos. 2 and 4 California Street, S. F.

SOLE AGENTS FOR

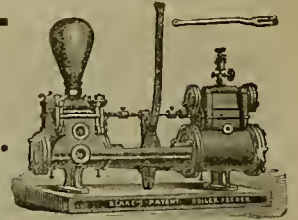
J. A Fay & Co., Wood Working Machinery.
Bement & Son's Machinists Tools.
Blake's Steam Pumps.
Perry's Centrifugal Pumps.
Gould's Hand & Power Pumps.
Perrin's Band Saw Blades.
Payne's Vertical and Horizontal Steam Engines.
Williamson Bros. Hoisting Engines.
New Haven Machine Co.'s Machinists' Tools.
Otto Silent Gas Engines.



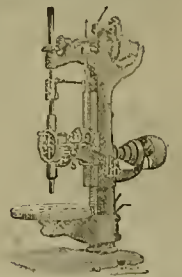
Hoisting Engines of all Kinds.

SOLE AGENTS FOR

Sturtevant's Blowers and Exhausts.
Judson's Steam Governors.
Pickering's Steam Governors.
Tanite Co. Emery Wheels.
Nathan & Dreyfus' Oilers.
Korting's Injectors and Ejectors.
Disston's Circular Saws.
Frank & Co.'s Wood Working Machinery.
New York Belting & Packing Co.'s Rubber Belting, Hose, Packing, etc.
Ballard's Oak Tanned Leather Belting.



BLAKE STEAM PUMP.
More Than 16,000 in Use.



GOLD QUARTZ and PLACER MINERS'

Silver Plated

AMALGAMATING PLATES,
For Saving Gold.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 2,000 ORDERS FILLED.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought, of gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Proprietor.



THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street

San Francisco, Cal.

L. C. MARSHUTZ.

T. G. CANTRELL

National Iron Works,

Northwest Cor. Main and Howard Sts., San Francisco,
MANUFACTURERS OF

IMPROVED PORTABLE HOISTING ENGINES

At Greatly Reduced Prices.

HOME INDUSTRY! ALL WORK TESTED AND GUARANTEED!

Stationary and Compound Engines, Flour, Sugar, Quartz and Saw Mills Amalgamating Machines.

CASTINGS AND FORGINGS OF EVERY DESCRIPTION.

Sole Manufacturers of Kendall's Patent Quartz Mills.

Pacific Rolling Mill Co.,

SAN FRANCISCO, CAL.

MANUFACTURERS OF

RAILROAD AND MERCHANT IRON,

ROLLED BEAMS, ANGLE, CHANNEL AND T IRON, BRIDGE AND MACHINE BOLTS, LAG SCREWS, NUTS, WASHERS, ETC., STEAMBOAT SHAFTS, CRANKS, PISTONS, CONNECTING RODS, ETC., ETC.

Car and Locomotive Axles and Frames, and Hammered Iron of Every Description.

HIGHEST PRICE PAID FOR SCRAP IRON

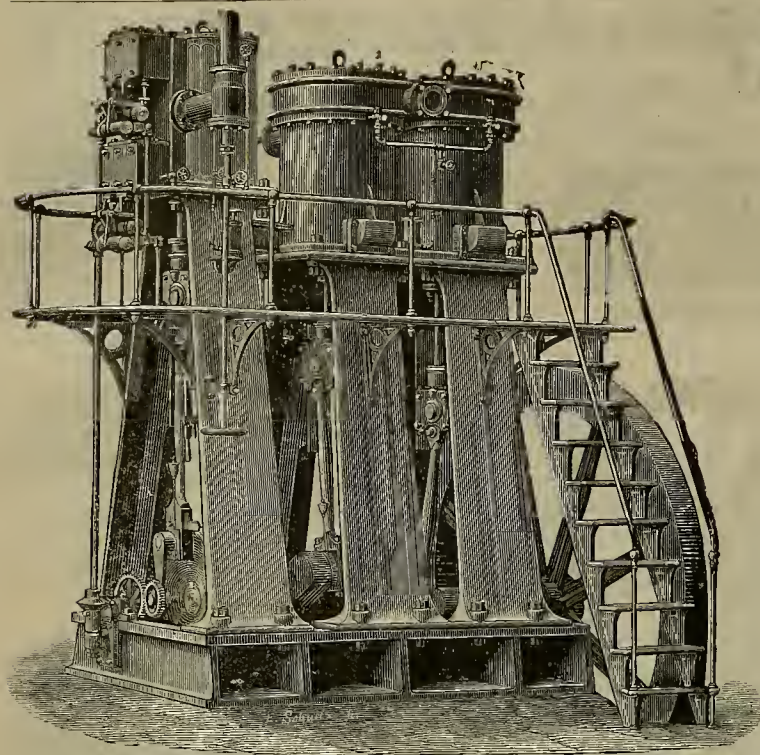
Orders Solicited and Promptly Executed.

Office, No. 202 Market St., UNION BLOCK.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 509 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St. S. F.

WIND MILL. One of the best made in this State for sale cheap on easy terms. Address, W. T., care of Dewey & Co., S. F.

Remittances to this office should be made by post order or registered letter, when practicable; exact postal order, for \$15 or less, 10 cts; for registered letter, addition to regular postage (at 3 cts. per half-ounce), 10 cts.



With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

Mining Machinery Depot, PARKE & LACY, 21 and 23 Fremont Street. S. F.

NO. 7 IMPROVED

AIR COMPRESSOR.

SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

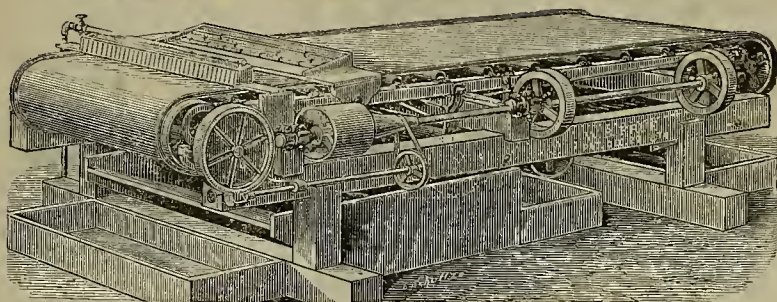
Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

\$1,000 CHALLENGE!



THE FRUE ORE CONCENTRATOR,

-OR-

VANNING MACHINE.

Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal.

A machine can be seen in working order, and ready to make tests, at the office of Hinckley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is a considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec 22, 1874; Sept. 2, 1879; April 27, 1880. Patent applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,
Room 7, 109 California Street, - - - - - SAN FRANCISCO, CAL.
Nov. 6, 1882.

EMERY WHEELS and GRINDING MACHINES.

The
Tanite
Company.

STROUDSBURG, MONROE COUNTY, PA.



Orders may be addressed to us at any of the following places, at each of which we carry a stock.

SAN FRANCISCO, CAL.

Nos. 2 and 4 California Street.

PORTLAND, OREGON,

No. 43 Front Street.

CHICAGO, ILLINOIS,

Nos. 162 and 154 Lake Street.
And 40 Franklin Street.

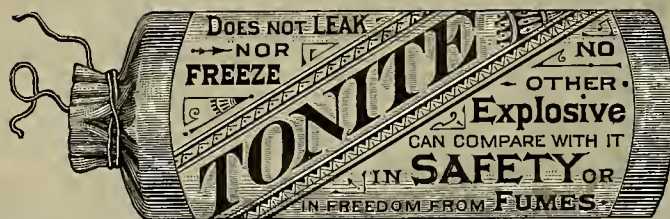
ST. LOUIS, MISSOURI,

No. 209 North Third Street

ST. LOUIS, MISSOURI,

Nos. 811 to 819 North Second Street

Contains no Nitro Glycerine or Chlorate of Potash, and is the only High Explosive Manufactured in America that does not contain these Dangerous Ingredients.



Price of Tonite Materially Reduced for 1883.

TONITE POWDER CO.,

No. 218 California Street, - - - - - SAN FRANCISCO.

ANTI-SCALE COMPOUND

Manufactured by RICKARD & DURDEN.

We guarantee that, with proper use, this Compound will remove and prevent all INCRUSTATION IN STEAM BOILERS.

Ten years trial, in widely separated localities, has demonstrated the value of this invention, and its applicability to different qualities of water. References cheerfully furnished to any one wishing same.

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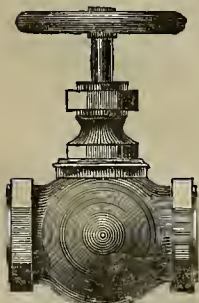
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, APRIL 14, 1883.

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Timbering in Mines.—No. 7.

It is of course natural to seek to simplify the timbering in accordance with the conditions of the walls. These conditions are so variable that it is extremely difficult to indicate them, and we take a single example, for which we are indebted for details to Mr. Jourmaux, of Charlevoix, France, whose account is published in "Lectures on Exploration of Mines," by Durat. We translate as follows:

The most variable style of timbering is that applied in galleries or tunnels. Many of these galleries are very long, and serve as passages where tramways are laid on which to haul out ore or waste. In the French coal mines the ground, according to the conditions of the solidity of the roof, is sustained by the different means shown on the figures of the engravings presented herewith. This employment of dry stone, which is furnished by the work as it progresses, admits of important economy in the consumption of wood, since in the coal fields of France the consumption has been very heavy and wood is scarce. The engravings show the various means adopted in French coal mines, according to the character of the walls and roof.

In Fig. 1 the roof and walls are wanting in solidity; the frames are complete and the lagging more or less close in accordance with the nature of the walls. Fig. 3 is for the same conditions, with one sidewall firmer than the part which is supported by the timbering. Figs. 2 and 5 represent the condition of a solid roof, while the wall of the bed needs to be held by timbering or by walling up. Fig. 4 represents a schistose roof cut across the stratification, but as it has a tendency to "slack," it needs to be held up with a transverse timber. Finally, in Fig. 6, all the walls are solid. All these forms have been applied in practice.

THE DEBRIS CASE.—United States Circuit Judge, Lorenzo Sawyer, has overruled the demurrer to the bill in the case of Edward Woodruff *vs.* the North Bloomfield Gravel Mining Company *et. al.*, with leave to the defendants to answer on or before the next Court rule day—May 1st. The bill was brought against several

there was a separate and joint cause of action in each case. That the defendants, severally and jointly, co-operated and precipitated tailings into the streams long before the waters reach the valleys, where the nuisance complained of was reached, and that they operated together in producing the nuisance complained

Gold Discovery near Phoenix, Arizona.

[From our Traveling Correspondent, B. W. CROWELL.]

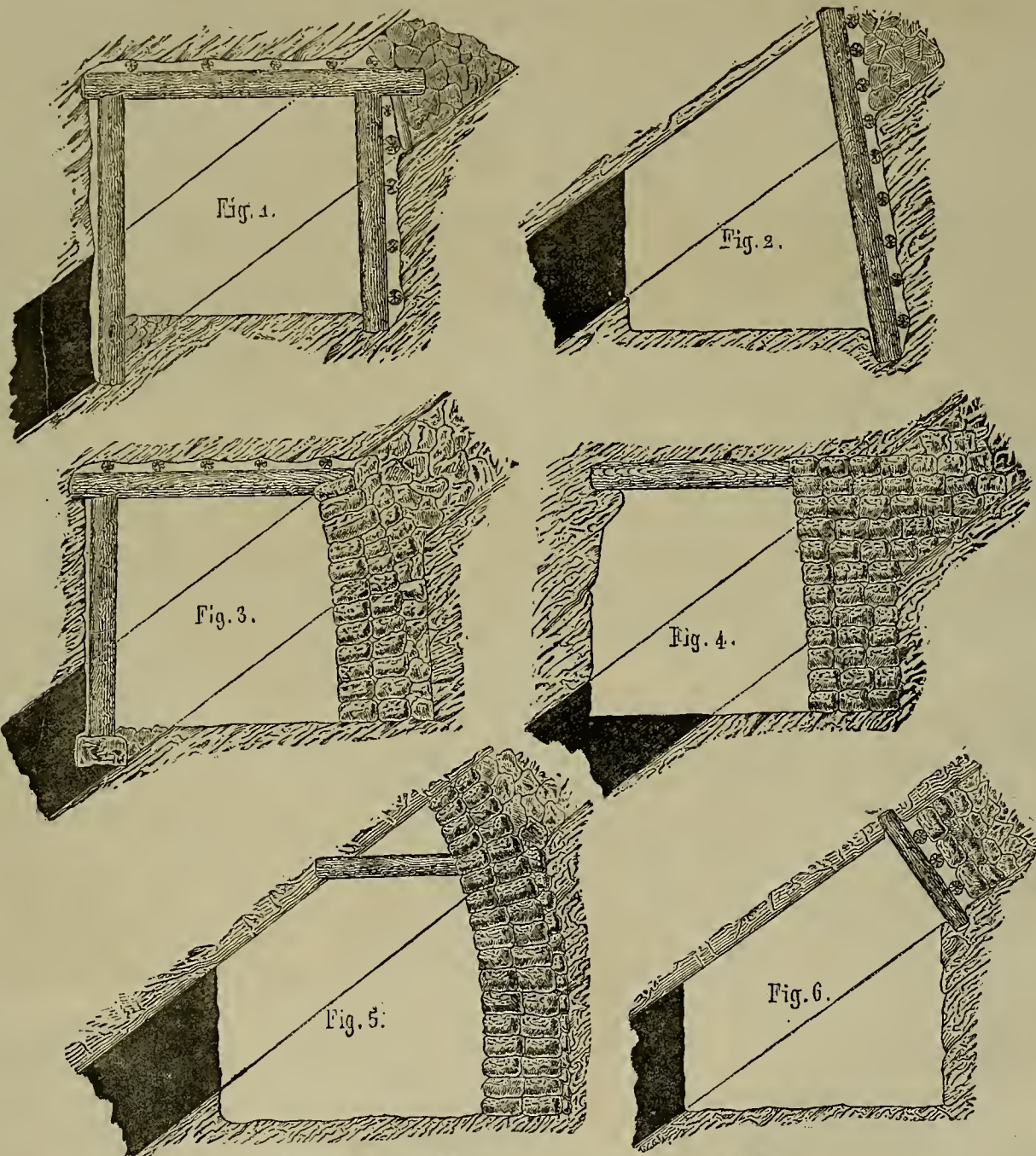
We now have a little gentle excitement right here in Phoenix. It is no less than a gold discovery, made public last Saturday evening, when W. N. Osborn and David Cling, came in showing fine gold bearing quartz, and assuring their friends that they had with the discoverers an interest in three claims just located, that they were assured from their small pannings would yield \$1.00 to the pound of ore. The claims are out about fourteen miles on Cave Creek road. The quartz is an out-crop, right out on the plains, 10 miles from water, and close to the main thoroughfare. If these parties are not greatly deceived in the initiatory showing, they probably have the outcropping of a real gold bonanza. From the small samples pounded and spooned it promised a yield of \$1,000 per ton. It is located in Magazine District, not far from John Osborn's old gold mine.

These first parties have located a strip 600 feet wide, by 4,500 feet in length, which they think covers the most of, if not all the ground that seems worth locating—yet some few are rushing out to do some prospecting in that vicinity.

"Old Probability," and several others, claim to have a long time known there would be rich claims located right there, or near there. Phoenix is a stirring stage and teaming center, twenty-eight miles from Maricopa, on the C. P. R. R., and the county seat

of Maricopa county. It is surrounded by well irrigated farming lands.

EXTRA EDITION.—We shall next week issue a twenty-four page edition of the MINING AND SCIENTIFIC PRESS, devoted more especially to the mining interests of Arizona. It will be fully illustrated and contain a large amount of matters of interest to the mining community.



METHODS OF TIMBERING AND WALLING IN GALLERIES.

hydraulic mining companies, severally owning mines at various points on the Yuba river and its tributaries, to restrain them from discharging the gravel, waste earth and mining debris, arising from working their mines, into the streams. Judge Sawyer, in a long decision, held, in effect, that the great damage alleged was multifarious, and that in the mining law

of. It was also held that any one of the parties in interest had a right to maintain an action without injury to other parties therein.

INFORMATION has been received at Candalaria that Mike Bonner, a former employe at the Northern Belle mine, perished on the desert between the terminus of the Carson and Colorado railroad and Calico mining district.

CORRESPONDENCE.

Notes From Eureka, Nevada.

(From Our Regular Correspondent).

EDITORS PRESS:—On Friday last, I visited the lava beds of the Eureka Con. Mine on Ruby Hill. Not a single Modoc did I encounter, but men of brawn and muscle were there. Armed with pick, shovel, hammer, drill, and gad, they were prospecting for ore in places where, years ago, the company did not think it worth their while; and in others that had been passed as useless to prospect in. This portion of Ruby Hill is being cut up and holed in every direction; old dumps are also being screened and assorted over for all that is in them which will pay to send to the furnaces. This work is being done by tributors, some of whom performed labor for a period of six months without making a dollar. Others however make strikes that pay them ordinary wages. When it happens that these tribute pitches prove very rich and extensive, it is understood by and between superintendent and the tributors, that the latter will surrender the pitch to the company, after having extracted sufficient ore to pay them for all the dead work that they have done towards the development of the ore body. Thus are others encouraged to persevere in the same manner, and on the same terms. At one of these places I found a chimney of ore five feet thick, that will work at the furnaces from \$60 up to \$150 per ton.

There is room enough in the unbroken ground in which it is incased to allow it to make into a body of considerable size and value. There are 130 men tributing in the Eureka Con. mine at present, the majority of whom are making less than \$1.25 per day. None of them are permitted to work on tribute where the superintendent thinks it will pay the company to employ miners at regular day wages. No place in the mine, as far as I went, from the surface down to the third level, is being left untried. Many of the old drifts, crosscuts, and winzes, that have been filled with waste rock are cleaned up, so that these openings may not be rendered useless by the tributors, who are permitted to stow away the debris in them for the time being, in order that they may put in their labor to the best advantage. It is also necessary to keep these places open to permit of proper inspection and thorough prospecting of the mine.

The Tributors

Are useful to the company, and there is not the least doubt that they can and do ferret out ore in places where it will not pay the company to hire men to do the dead work. They not only take chances on the smallest streaks, but often gouge into large bodies of low grade ore, of which there are many in the mine, and in them find chimneys that pay tributors to extract, when it will not pay the company to touch them. Why such bodies of ore are left standing in the mines, it is proper to explain. Ordinarily, large deposits of ore found in the Ruby Hill mines are of the least value near to the country rock, but the quantity of them improves as development is made. For instance, when one of these ore bodies is discovered, the portion of it nearest to the country rock may not carry more than four or five ounces of silver to the ton. After penetrating it for a distance of three or four feet, the value may increase to six, eight, or ten ounces. The next three or four feet may carry fifteen ounces of silver to each ton, and so on, until that portion of the deposit is reached which will pay the company to extract. Had the company extracted the ore from some of the immense chambers in the mine, taking all of the ore in them as it was found, by mixing the very low with the higher grades, they would have suffered a great loss. When the low grade ore left standing in the mine is prospected by tributors, it becomes necessary to allow them a liberal percentage to pay them for assorting it; otherwise a great quantity would be sent to the furnaces that it would not pay the company to smelt. The same rule obtains where rich ore is found by them in small veins, and the waste rock surrounding it is soft, or broken into small particles.

Running from the old Windsail shaft, on the third level, is a fair-looking fissure, in favorable ground. This, I learn, will be thoroughly prospected.

From the Compromise Line,

Which separates the Eureka Con. mine from the Richmond Company's, extending, as I am informed, from the 1st to the 5th level, and from the lava beds to the shale, is an immense block of ground, that hitherto has been considered unfavorable for ore. Drifts and cross-cuts have been driven through this at intervals, but they are so far apart that ore bodies of considerable size may exist in it. All this portion of the mine will now receive close attention, and the result may be gratifying to the stockholders.

The water has been increasing so rapidly in the Locan shaft during the past few days that progress on sinking was retarded. Work on it was suspended, but was resumed to-day. The water which was formerly pumped into the tank at the 600 foot station is now being lifted

to the surface, and, to facilitate the work, an additional boiler is being set in place. The increase of water is doubtless caused by storage in some of the large cavities existing in the country rock. These are drained by the hydraulic pump as quickly as possible, and cause only temporary inconvenience. As the readers of the MINING AND SCIENTIFIC PRESS will, no doubt, be glad to know how the Eureka Con. mine looks below the third level, I shall visit it again as soon as possible; probably during the week, and in time for description in my next letter. The

Mines on Adam's Hill

Are receiving rather more than ordinary attention at present. Several persons working under lease on some of them are meeting with very good success. Applications for tribute pitches were made to the owners of the Oriental and Belmont mine this morning by a party of Ruby Hill miners, but they were refused. I have inquiries made of me every day.

For Miners to Lease

On Prospect mountain, also on Silverado mountain, in Pinto district, and, if the present depression lasts, it seems probable at least that the mines outside of Ruby Hill will not sniffer by it. The Berryman Tunnel and Mining Company perfected their organization a few days ago, and commenced work on their claims on Silverado mountain this morning. Only local capital will be used at present. The work of development will be conducted with the closest economy. Not even the superintendent will receive payment for his services beyond regular miner's wages, and that he will have to earn as a practical miner by hard labor upon the ground.

At the Eureka Tunnel.

Miners have been bidding for contracts at almost starvation rates, and work upon the new engine shaft has been thrown up by them. This cannot go on, and the mine be worked, so a contract for sinking the next 50 feet of the shaft will be let to-morrow, upon more reasonable terms. The engine is in its place, and will be given steam as soon as the cable is placed on the reel. The ore veins above the first discovery chamber is running very irregular, and at present is making stronger at the south end than at the north. A nice vein of yellow carbonate ore in black oxides of manganese, is being followed from the 65 foot drift, north from the south winze, old works. No. 3 drift from bottom of same winze is in about 50 feet towards engine shaft; still looking well, but with no change. The Addison chamber underneath it, is still looking well, and producing ore, same as last reported. A track is being laid in the south drift, 105-foot level, to an incline winze, now down 75 feet. There is good carbonate ore at this point. There is but little change to note in other parts of the mine. The regular quantity of ore is being hauled to the furnaces.

Last month, 250 tons of ore was shipped from the Home Ticket Mine, to the Richmond furnaces. The quality of ore from this is improving to such an extent, that the owners of the Chipper Claim adjoining, will start to work sinking upon that property as soon as the snow disappears. Considerable discussion is being indulged in at present, in relation to the mines upon Home Ticket Hill, caused mainly by an article that appeared a few weeks ago in a west of England newspaper, a portion of which was copied in the *London Mining Journal* issued March 17th. The result, it is hoped, will be of benefit to Eureka district. M. H. JOSEPH.

Eureka, April 4th.

Como District, Nevada.

EDITORS PRESS:—There is nothing of interest to write concerning the Comstock mines. The work of opening out and exploring, is going on in the lower levels; from the 2500 to the 3100. What will be developed in the future, of course, cannot be told. The prospect thus far does not give much encouragement for the finding of ore bodies. There is being considerable low grade ore extracted from the upper levels of the Belcher, Crown Point, Kentuck, Yellow Jacket, Imperial Consolidated and Chollar. The Ophir company is also extracting some. C. C. Stevenson, having a lease of the Lower Comstock and Royal mine (at Silver City), after having been to much expense to clear the mine of water, has about succeeded and is prepared to prospect for ore, which he will doubtless find and extract. Mr. Stevenson has the knack of finding ore generally, when he goes after it; therefore he is a good man for the community, as he puts considerable money in circulation, paid to employees at the mine, and his mills where he reduces the ore. Teamsters also get their share for carting the ore. There is also the money paid out for supplies for the mines and mills. All of which is of much benefit, and highly appreciated these dull times. You have heard much of

Como and Palmyra,

Situate about twenty miles from this place. Indications of mines existing there were discovered as early as 1862. In 1863 and 1864 there was considerable excitement in regard to the mine, which took quite a population up there, consisting of miners, traders, saloon keepers, gamblers, and loafers, and much was said of the Como mine. The excitement was kept up until John B. Winters built a mill there, as there

had been none put up nearer than the vicinity of Dayton, some fourteen miles off. Quite a number of tons of ore were reduced at the Winters mill, but it seems that it did not yield equal to expectation, which threw a damper on the whole camp, causing a great stampede, leaving it almost deserted. It has remained so ever since, with the exception of about three years ago, some miners went up there, and went to work to relocate the old locations, and do prospecting work on them. They reported their prospects good, and others went, carrying with them the followers to all new mining camps. The Eureka company seemed to be the most lucky one, for they sunk a shaft to a depth of 70 feet, and took out considerable ore. They made so good a showing that a Mr. Walter made a contract with them to the effect that if the company would furnish him with a certain quantity of ore at a stated price, he would put up a mill and reduce their ore. He erected a five stamp mill, and a hoarding-house for his employees. He ran quite a number of tons of ore through his mill, but it did not pay, although it assayed well. Why the yield of the mill was not better, I do not know, unless the ore was not properly handled, and most of the gold and silver was lost. The men interested in the mine were all poor, and had to discontinue work. They had not the means for putting up the necessary works to carry it on, therefore were compelled to stop. At no time from the first discovery of precious metal ores at Como and Palmyra had capitalists gone there and expended an amount of money sufficient to open and develop a mine. Everything that was done was done by poor men, who had the faith, but not the means to develop the mine. I lately visited the place to see for myself what was the

Cause of the Failures

To develop a prosperous mining camp where there had been so much ore found that gave good assays. I at once saw what seemed to me to be the trouble. The mines are of such a nature that capital is required to open and develop them. There is but little cropping at the surface, therefore men with nothing but muscle were powerless to succeed. The distance to water is but short, and when that was encountered work had to cease. When a depth was attained that the hoisting could not be well done by a windlass, the shaft had to be abandoned. The ore is free milling, and there is no reason why the silver and gold cannot be saved if properly handled. The assays show that the ore yields two thirds gold and one third silver. The Eureka G. & S. M. Co. is

The Only Company Now Operating

There. They have expended about \$25,000 on the mine since they commenced work. Having worked down with a whipsaw, until water was encountered, they commenced a new three compartment shaft and carried down two compartments to a depth of 200 feet, with a sump below. The shaft is well timbered, and is a good one. They have out on the dump from forty to fifty tons of ore taken out of the old shaft, which it is thought will yield \$100 per ton. The vein, as shown by the different workings, is 125 feet in width. There is a steam pump in the new shaft which takes out the water and keeps the mine drained. At the bottom of the shaft a spacious station was cut out and timbered, from which a drift was started west towards the vein, sixty feet distant. At the time I was there the east wall of the vein was reached and cut through, showing quartz, clay and porphyry mixed together. The quartz gives good assays; and when a little more advance is made in the vein, a better opinion can be formed of its value. I examined it closely where the opening was made and found it to be exactly similar to the Comstock. The material composing it is the same as is found here where paying ore is found. I see no reason why the company will not develop a good mine. There are certainly all of the characteristics required, to warrant the belief that a valuable and permanent mine will be developed. It may be that a cross drift through the vein will determine the matter, and it is the intention of the Superintendent to carry it through to the west wall, a distance of 125 feet. They have in their hoiler and engines plenty of power to do the hoisting to a depth of 1,200 or 1,500 feet. The company purchased the machinery, galloons frame, building, cars, wire rope, &c., from the Europa Company of this place, and have a good outfit for opening and working the mine, which they seem determined to do. Mr. H. L. Symons is acting as Superintendent, and has been, and is, carrying on the work with economy and much mining skill. He has taken the proper course to develop the mine, and with much economy, and is convinced that he will be successful in opening one that will be very valuable. The cross-drift through the vein at the 200 level may be the means of determining the question of its being a good permanent mine, without being obliged to wait until a greater depth is attained. I am of the opinion that if the vein was narrow and the ore consequently more concentrated, it would be much better than it is. Of course future workings will determine that.

The kind and character of the formation in the Como district, was a surprise to me. I found it much more favorable for mines than I had expected. As the Eureka Company have the means and the faith, I suppose that they will go on and demonstrate the fact, that they have a valuable mine or not, which will decide the fate of the camp. JAMES DELAVAN.

Virginia, Nev., March 30.

Spring Valley Mines.

The Eagle mine, at Spring Valley, one of a number owned by the Vandewater G. & S. M. Co., a New York corporation, is being worked under the supervision of Major E. D. Luxton, and is producing sufficient ore to run the company's fifteen-stamp mill steadily. The company employs thirty men at the mines and mill, and every one of them, from superintendent down, work at something about the premises. The mill is running on gold-bearing quartz from the Eagle mine, and is paying the expense of mining and milling as well as that of developing the company's mines. A double compartment shaft is being sunk on the Vandewater mine, which adjoins the Eagle on the east. It is designed to sink this shaft to a depth of 400 feet, and then run levels along the lead into the Vandewater and Eagle ground. Some very fine silver ore is being found on the Vandewater as well as in the lower works on the Eagle; while west of the Eagle, on the Troy lead, also owned by the company, galena ore, carrying gold and silver in paying quantities, has been found.

When the bodies of silver ore known to exist in the Vandewater are developed, improved machinery will be put in the mill, which is now run on gold ore exclusively, to reduce and amalgamate it. Some trouble has heretofore been experienced from a scarcity of water in the fall, but this will be overcome when the shaft is sunk, as that will furnish water for milling purposes at all seasons of the year. The ledge, which has been opened at one point on the Eagle to a depth of 212 feet, is one of the best defined in the State, and there is no question as to its permanency. It is expected that very rich bodies of gold-bearing quartz will be found in the mine, as the gulches below it have been worked for years for placer gold, and have produced, as nearly as can be ascertained, about a million dollars in gold dust. Chinese are yet at work in the diggings, and notwithstanding the great scarcity of water, manage to make wages. With the example of the Arizona mine before him, the superintendent hopes to be able to convince the company that the true policy in mining is to prospect ahead at all times, so that when there is a fault or a barren place in the lead, mills will not have to stop for want of ore, and the mine will not be condemned as worthless, as in the case of the Arizona, which although it yielded millions, was closed down when a non-productive zone was reached, while beyond it, as has since been demonstrated, large and rich ore bodies exist. It is the opinion of experienced mining men that the expenditure of a few thousand dollars in sinking the shaft already commenced on the Vandewater Company's mines, and running levels on the lead from that shaft, will develop one of the most valuable mining properties in the State.—*Silver State*.

The Lake Valley Mines.

The *Leader* says that a letter from an old Eureka, now at Lake Valley, to a gentleman at Eureka gives the following regarding that country: The mines are described as being very shallow, all of the ore being near the top. That which is found, however, is very rich, going as high as \$2,000 per ton. An Eastern company owns everything that is worth owning. It has one furnace, which runs but a portion of the time, as the ore is not found in sufficient quantities to keep it going. Two "cupels" have been erected, but are a failure, and but one at a time is put in operation, as they do not stand the test for more than twenty-four hours.

The writer states that there are a number of Eureka men there who could build good ones, but for some reason or other the company will not permit them to make a trial. He advises his friends not to go there, as there is no money in the place and wages are very low. Miners get \$3 a day; and are compelled to work ten hours; furnace hands, \$3 and \$3.50 per day, according to their merits; engineers, \$4 per day of twelve hours; and chief smelters, \$4. Board costs \$8 per week, and, as the correspondent says, "d—d poor at that."

The climate is described as being nice enough, and the country a pleasant one to live in, but as for money-making, that is out of the question. Everything is slow-going, the place overrun with all classes of people seeking employment, and, all in all, a good place—to stay away from.

A CHANCE FOR A MILL MAN.—A practical mill man with a little capital is needed here. Should such a man choose to avail himself of the opportunity presented, he will find a large return for the money invested. Should a mill be erected about one half a mile south of the lake, on the line of the railroad, where abundance of good water can be had at a depth of not more than thirty feet, and where wood can be easily obtained, it would draw custom from the mines on Mount Grant, Mount Cory and the canyons south; also from Santa Fe and the numerous other districts in that direction. Ores that are now shipped to San Francisco for reduction would be worked here, to save cost of transportation; and owing to the great number of claims from which small quantities of ore are being taken and the great variety of ores, there is no question about a reduction works situated at this point, which is centrally located in respect to so many of the districts, doing a profitable business for years to come.—*Northwestern Bulletin*.

MECHANICAL PROGRESS.

Masonry—Ancient and Modern.

Masonry is the art of arranging stone or brick in proper form so as to produce a regular construction; the term is popularly applied to stone-work, however, in contradistinction to brick-work, which is generally employed with reference to the use of brick.

The masonry of the ancient Egyptians was remarkable for the large size of the stones employed, sometimes as much as thirty feet in length. They were laid without mortar.

The Cyclopean or earlier masonry of the Greeks, some remains of which exist in the walls of Mycenae and Tiryns, was formed of large and irregularly shaped masses of stone, the interstices being filled with smaller stones. Tyrrhenian or Etruscan masonry is also composed of similar stones, but so fitted together as not to admit of smaller stones between them. The more ancient remains of Greece and Italy afford examples of this kind of masonry. Peru also affords remarkable instances of Cyclopean masonry.

To this succeeded the practice of making the beds horizontal or nearly so, but the vertical joints were irregular. All the preceding were laid without mortar. The Phœnician ashlar masonry is known by its bevel, and the specimens uncovered at Jerusalem are of surpassing interest.

The Greeks and Romans used several methods for walling, as the *opus incertum*, formed of square stones laid horizontally, the interior being of small stones; the *opus recticulatum*, composed of square stones laid diagonally; *isodomon*, in which the courses were of equal height; *pseudoisodomon*, in which they were unequal; *Greek implectum*, formed altogether of coursed work, and Roman *implectum*, of coursed work on the outside, the interior being of rubble. In these the stones were small and laid in mortar. Where large stones were used, no mortar was employed. The Roman *implectum* found in England has sometimes courses of tiles built in.

In a few of the earlier English buildings, considered by some to be Saxon, the quoins, the door and window jambs, and occasionally some other parts, were formed of stones alternately laid flat and set up endwise; the latter were usually much longer than the others. This is termed long and short work. In the Norman period, herring bone work, consisting of stones laid endwise in an oblique direction, with alternate courses laid horizontally, was frequently employed in rubble walls.

The stones used during the middle ages were seldom larger than could be lifted by two or three men.

Modern Masonry.

The various kinds of masonry employed in modern practice, may be divided into three principal classes: Rubble work, in which the stones are not squared; coursed work, in which the stones are squared more or less, and set in courses; and ashlar, when each stone is squared and dressed to give dimensions. Some of these kinds are used conjointly, as rubble with cut stone plinth, quoins, piers and coping; ashlar facing filled in with rubble, etc.

The largest stones ever placed in a wall by the hand of man are probably those in the foundations of the temple of Baalbek. Thompson says:

"The first tier above ground consists of stones of different lengths, but all above twelve feet thick, and the same in width. Then come three stones, each more than sixty-three feet long. One of them lies in the quarry, where it can be viewed all round, and measured easily. It is fourteen by sixteen, and sixty-nine feet long. It is one and one half miles distant from the temple." The stones are so well laid and jointed, that it is difficult to find the crack, which, indeed, will not admit the blade of a knife. Dr. Thompson says he quite overlooked it at first, and supposed the stone to be 120 feet long.

The foundation is much older than the Greek temple which was built upon it and occupies a portion of the area. The stones of the former building are believed to have been cut up to form the shafts, capitals, etc., of the Corinthian temple subsequently built. The original was probably the work of that Great Asiatic nation of which the Phœnician people was an outlying branch, and possibly Arabia the home.

The term monolith is applied to a structure consisting of a single column or block. Also to such erections as the obelisks of Egypt, some of which are now in Rome, Paris, London, and New York. The term monolith is likewise applied to structures in which the blocks are immense, in some cases reaching from the foundation to the entablature, as in the United States Treasury at Washington. This building is said to have larger stones than any used in the pyramids of Egypt, and to be a more massive construction in respect of the size of its stones than any other building in the world, except the church of St. Isaac, at St. Petersburg, Russia.

The Largest Monolithic Temple.

In Egypt is that of Tel-el-mai; on the Delta. It is twenty-one feet nine inches high, thirteen feet broad and eleven feet seven inches deep. This size is much exceeded by the dimensions given by Herodotus of the temples of Amasis and Latona, which were also, we are informed, on the Delta. The former one, he states, required three years to transport, with the aid of 2,000 labor-

ers, from Elephantine to Saïs, a distance ordinary of twenty days Nilotic navigation. The temple of Latona was still larger. "The most wonderful thing," says Herodotus, "that was actually to be seen about this temple was a chapel in the inclosure made of a single stone, the length and height of which were the same, each wall being forty cubits square (60 feet), and the whole a single block. Another block of stone formed the roof and projected at the eaves to the extent of four cubits." According to the measurements, supposing the walls to have been only six feet thick, and the material granite, as in all other monoliths, this monument would weigh 7,000 tons, being 76,032 cubic feet, without the cornice, which was placed on the roof. This capstone would weigh 2,400 tons, if six feet be taken for its thickness.

Progress of the Steam Boiler.

Mr. John Whitelaw recently read an interesting paper before the Civil Engineers' Club of Cleveland, Ohio, showing the gradual progress which had been made in the duty of steam engines during the last 100 years, from which we collate as follows:

In this country, the duty of a pumping engine is estimated by the number of pounds of water raised one foot high on a consumption of 100 pounds of coal. Thus the record of pumping engines is stated to be a certain number of pounds of water raised one foot high for each 100 pounds of coal burned.

The present results show remarkable gains over the old-time engines. In 1770, Jonathan Hornblower and John Nancarrow were the most noted builders of pumping engines. The best average duty which they were able to get from 100 pounds of coal was, in round numbers, 6,000,000 foot pounds. The present engine does more than sixteen times as much work for the same fuel as the old style of machines. These were vacuum engines. Steam was only used to make a vacuum, and thus generating power. James Watt's improvements followed, and in 1793 he had so far improved the steam engine that his best machine made an average duty of 27,000,000 foot pounds per 100 pounds of coal. The engines now in use at Lynn, Mass., do about four times better than that. Watt, in his time, pronounced his engine perfect, and said that no further improvement could be expected.

In 1814 Arthur Woolf made engines that showed a duty of 34,000,000 foot pounds; and in one example a duty of 72,000,000 was reported.

In 1828 Capt. Grose made improvements on his engine, and the duty was found to be a little over 87,000,000 pounds.

In 1834 William West produced an engine that yielded a duty of close on to 99,000,000 of pounds.

In 1840 Hocking and Loam extended the expansion principle, and in 1842 one of their engines showed a duty of 107,000,000 pounds—a result that is hard to beat at the present time.

The boiler engineering and firing of the old time was very peculiar. Instead of increasing the number of boilers when more steam was required, they used to have one boiler of gigantic dimensions, with correspondingly large fire-place. They also placed the fire bars eight or ten feet below the bottom of the boiler, and then filled up the space with coal. They thought the more coal they burned the more steam they would get. A boiler at Daletholm mine was twenty-four feet in diameter and twenty-four feet high. The furnace was seven feet below the bottom of the boiler, was nine feet wide, and extended from one side of the boiler to the other. Trevithick said the fire in this boiler was seven feet thick, and had in it thirty tons of coal.

SOLID AND HOLLOW IRON COLUMNS.—A confusion of ideas is sometimes found among practical men respecting the comparative strength of solid and hollow pillars. One hears it often said, says the *Building News*, that a hollow pillar is stronger than a solid one. Now this is, as an able authority has pointed out, not absolutely the case; it is perfectly true, that, comparing the strengths of two pillars of the same height and diameter, one solid and the other hollow, the latter has the advantage of being economically stronger. The fact is, the solid column is stronger than the hollow of the same external diameter; but the lesser area is more effective than the greater, because the central portions of the solid pillar are less useful in resisting the bending force than the metal in the circumference of the hollow pillar. But if the quantity of material in both the solid and hollow pillar of equal height is the same, the hollow pillar is by far the stronger. A simple geometrical construction will enable any one to understand this fact, by enabling us to proportion a hollow column of the same area as that of a solid one, by one of the diameters being given.

It is shown, in fact, that hollow columns of the same area of metal as a solid one may be made to any larger diameter, their strengths increasing proportionately till a limit is reached by the shell of the metal becoming too thin to insure a sound casting. Taking an example from Downing's work, a hollow pillar nine inches in external diameter, having an internal diameter of 8.062 inches, and a thickness of metal of 0.47 inch, or about one half inch, is five and one half times stronger than a solid pillar with the same quantity of metal. A thickness of one half inch may be regarded as a practical limit in manufacture.

SCIENTIFIC PROGRESS.

Long Distance Telephoning.

That the telephone will soon almost entirely supplant the telegraph, even for long distances, is quite a matter of certainty. In many places, even now, it is common to use the telephone for all distances for twenty-five to seventy-five miles or more. Experiments are now being made at the east to show the practicability of the telephone for hundreds of miles.

A notable experiment in long distance telephoning was recently made on the new compound steel-copper wire of the Postal Telegraph Company, lately completed between New York and Cleveland, Ohio, a stretch of 650 miles.

The compound wire has a diameter of seven thirty-seconds of an inch, consists of a steel core, weighing 200 pounds per mile, that will resist a tensile strain of 1,650 pounds, on which copper is deposited to the extent of 500 pounds per mile. The wire has seven times greater conductivity than iron wire of equal size, copper being the best conductor known except silver. It has double the tensile strength of iron wire, or equal weight when strung on the lines, will last longer, permits the use of low tension currents and small batteries.

Ninety per cent. of the wires now in use are No. 9 iron with a resistance of 20 units per mile, and the very best are No. 6 with a resistance of 10 units, while the compound wire to be used by this company has a resistance of only one and seven tenths units. The resistance of No. 9 iron wire on a line from New York to Chicago, 1,000 miles, is over 20,000 units, and on a No. 6 iron wire over 10,000 units, and on the compound wire less than 1,700 units, thus bringing Chicago telegraphically as near to New York as Philadelphia; and San Francisco as near as Cleveland, compared with the best wires now in use.

When the two compound wires are completed between New York and Chicago, their operating capacity will, it is said, be thirty thousand messages per day.

The new conducting wire is certainly a great improvement over any land line of similar length heretofore established, and its successful completion marks the opening of a new era in the progress of electrical communication.

The new wire with its accompanying improved transmitter is likely to revolutionize the telegraphic service of the world by leading the way to the substitution of easy, economical, and scientific lines and modes of working in place of the present systems, which, by comparison, are difficult, costly to operate, and unscientific.

The ordinary electric telegraph has become altogether too old and clumsy. The progressiveness of the age demands some improvements on an institution which is now nearly a half century old. Fifty years is too long to stand still, and now we are soon to have the telephone for all distances. The human voice will soon traverse the ocean as well as the land, and America will talk to Europe *à la vue*.

Hearing in Insects.

The sense of hearing in insects has recently been carefully studied by Herr Gruber. According to an English journal, that scientist has found the common cockroach to be very sensitive to music. On sounding a violin note when a cockroach was running across the floor, the insect would suddenly stop. When a number of those insects were placed in a glass vessel, on making a strong sound near them, they manifested great agitation and excitement; some would even fall down from the sides of the glass, as if paralyzed. When one of them was hung by a thread attached to its hind leg, and when quiet, if a bow was drawn sharply over the violin strings, at a distance of four or five feet, the insect would be greatly excited, and struggle frantically to get its head uppermost.

Beetles were also similarly affected by sounds, but grubs and ants gave no certain indications. Of aquatic insects, various kinds of *corixæ* were tried. These would often remain very quiet for a time, but, on tapping the glass with a glass tube, they would rush about with great agitation.

A disk at the end of a long rod, drawn to and fro in the water near a quiet *corixa*, produced no effect; but by conveying the sound of a struck bell into the liquid by the rod, there was a lively reaction; similarly when a howl drawn across a glass bell was brought in contact with the water. These creatures were also sensitive to high violin notes in the air, and to the sound of a metal plate struck by a hammer, etc.

Still more sensitive were various aquatic beetles. On the other hand, various larvae, especially ephemerides, were unaffected; but these were sensitive to mechanical agitation of the water. Herr Gruber considers the response the insects make to sound an indication of their hearing, and not mere reflex action.

THE USE OF GAS FOR HEATING AND POWER.

Dr. C. Siemens predicts a vast extension of the consumption of gas in the future for heating and power. It will effectually dispose of the smoke nuisance, and will afford in time a more economical and convenient fuel. When heating gas is supplied to us from street mains at twenty-five cents per 1,000 feet, as it will be at some time in the near future, the housekeeper's millenium will not be far off.

Primeval Celtic Map Stones.

In many parts of Switzerland are often found smooth, flat stones, evidently hand-polished, and covered with dots, lines, circles, and half circles. The origin and use of these stones, known among country people as *Schalensteine*, has long been moot point among the learned. Some have thought they were charms, others that they were meant to commemorate the dead, or that the signs on them were undecipherable hieroglyphics; but it has been reserved for Herr Rodiger, of Bellach, in Solothurn, to throw a new light on these mysterious relics of the past, and suggest a theory concerning them which seems to meet all the necessities of the case. The *Schalensteine*, he says, are neither more nor less than topographical charts, as a comparison of them with any modern map of the districts in which they are found will show. The engraved dots correspond with existing towns and villages, the lines with roads. Even the fords and mountain passes are indicated. Herr Rodiger has examined many of these stones from various parts of the country, and he possesses a collection, picked up in Solothurn, which form together a map of the entire canton. Another significant circumstance is that the *Schalensteine* are mostly found at intervals of about two hours (say, six miles) from each other, and at spots where several roads meet. The former, Herr Rodiger calls "headstones" (*Hauptsteine*), the latter he designates "by-stones" (*Nebensteine*). If he be right in his hypothesis, the places where these stones are met with possessed considerable populations long before the dawn of history; even the villages shown on the *Schalensteine* must be far older than the Christian era. Herr Rodiger considers the Swiss map stones to be of the same origin as the similar stones which are found in Germany, Scandinavia, India and further Asia, and sees in them another proof of the high antiquity and common origin of the Indo-Germanic races, and the existence among the latter, in an indefinitely remote age, of civilized habits, organized trade, and more culture than is generally supposed.

RAREFIED AIR AS A CONDUCTOR OF ELECTRICITY.—Edlund continues his researches upon this subject. A number of experiments are described to show that the phenomena of the opposition to the passage of sparks from terminal to terminal in rarefied air cannot be explained by the theory that a vacuum does not conduct electricity. He carefully discusses the question of the contrary electro-motive force which is developed at the terminals. "It is not the resistance of the gas but this electro-motive force, increasing with the rarefaction and connected with the electrodes, that presents an obstacle to the passage of the current. Everything is in favor of the hypothesis that vacuum opposes a very feeble resistance to the propagation of electricity." Without the employment of electrodes, one can excite an induction current in a Geissler tube, which is sufficient to produce light. This would be impossible if the highly rarefied gas or vacuum were an insulator.—*Phil. Mag.*

SUDDEN DESTRUCTION OF MARINE ANIMALS. In the *Geological Magazine*, Professor T. Rupert Jones accounts for the manner in which large numbers of marine animals have, in past ages, suddenly perished in their own element and become entombed: 1. (fishes) by either usual or periodical influx of fresh water from the land; 2. by volcanic agency; 3. by earthquake waves; 4. by storm; 5. by submergence, when massed together in frightened shoals, or when burrowing in sand or mud and accidentally buried by other sand and mud; 6. by being driven ashore by fishes of prey; 7. (fishes and mollusks) by too much and too little heat in shallow water; 8. by frost; 9. (fishes) diseases and parasites; 10. (fishes and mollusks) miscellaneous causes, such as ferruginous springs, poison, lightning, etc.

ELECTRICAL LIGHT OF COMETS.—According to Huggins, comets emit a characteristic light, which indicates, by special analysis, the presence of carbon, hydrogen and nitrogen, elements which are shown by the spectra of acetylene and cyanhydric acid. Berthelot thinks that these results point to an electric origin of the light. He has shown that acetylene is formed immediately and necessarily, whenever carbon and hydrogen come under the influence of the electric arc. When nitrogen is added to acetylene, the electric influence produces cyanhydric acid. It seems scarcely possible to conceive of a continuous combustion in cometary matter, but an electric illumination may be easily understood.—*Ann. de Chim.*

COMMON GEOLOGICAL TERMS AND COLORS.—At the Geological Congress, held in Bologna, the precise meaning to be given to words used in descriptive geology was determined, and a common scale of colors for geological maps was adopted. It was also resolved to prepare and issue a geological map of Europe on a large scale, at a cost of \$12,500, to meet which the Governments of Europe are expected to contribute.

A COMET REAPPEARS.—A cable message announces the discovery of D'Arrest's comet, by Dr. E. Hartwig of the Strasbourg Observatory. He predicted the discovery about April 23d. This comet was first discovered by D'Arrest at Leipsic, in 1851. It was observed again in 1857-8 and in 1870.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

ASSESSMENT LIST		NO. AMT. LEVIED.		DELINQ'T SALE.		SECRETARY.		PLA. OF BUSINESS.	
COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T	SALE.	SECRETARY.	PLA.	OF BUSINESS.
Albion Con M Co.	Nevada.	13.	50.	Mar 6.	Apr 9.	Apr 30.	R L Shainwald.	327 Pine	st
Alta S M Co.	Nevada.	26.	25.	Mar 10.	May 15.	Jun 4.	W H Watson.	302 Montgomery	st
Argenta M Co.	Nevada.	15.	25.	Mar 20.	Apr 23.	May 14.	E M Hall.	327 Pine	st
Bodie Con M Co.	California.	2.	50.	Mar 5.	Apr 16.	May 16.	C W Sessions.	310 Montgomery	st
California M Co.	Nevada.	7.	20.	Feb 27.	Apr 6.	May 4.	C P Gordon.	300 Montgomery	st
Challenge Con M Co.	Nevada.	2.	10.	Mar 27.	May 2.	May 23.	W E Dean.	309 Montgomery	st
Chollar M Co.	California.	11.	50.	Mar 27.	Apr 30.	May 21.	W E Dean.	309 Montgomery	st
Con Pacific M Co.	Nevada.	12.	30.	Mar 22.	Apr 30.	May 23.	F E Luty.	380 Pine	st
Day S M Co.	Nevada.	12.	30.	Mar 13.	Apr 12.	May 4.	E M Hall.	327 Pine	st
Elko Con M Co.	Nevada.	1.	15.	Mar 10.	May 15.	Jun 7.	F Sperling.	300 California	st
Eureka Con M Co.	California.	3.	100.	Mar 10.	Apr 10.	May 14.	P Jacobus.	309 Montgomery	st
Grand Prize M Co.	Nevada.	13.	30.	Mar 15.	Apr 16.	May 7.	E M Hall.	327 Pine	st
Independence M Co.	Nevada.	10.	30.	Mar 5.	Apr 10.	May 2.	W Pew.	310 Pine	st
Julia Con M Co.	Nevada.	18.	10.	Apr 10.	May 14.	Jun 4.	H A Charles.	410 California	st
Justice M Co.	Nevada.	13.	30.	Feb 27.	Apr 4.	Apr 23.	K E Kelly.	309 Montgomery	st
Martin White M Co.	Nevada.	14.	25.	Mar 22.	Apr 2.	May 13.	H E Scoville.	300 Montgomery	st
Mount Potosi M Co.	Nevada.	9.	25.	Apr 2.	May 7.	May 23.	J H Sayre.	330 Pine	st
Potosi M Co.	Nevada.	11.	25.	Mar 21.	Apr 24.	May 15.	W F Dean.	309 Montgomery	st
Scorpion M Co.	Nevada.	15.	25.	Apr 6.	May 10.	May 31.	G R Spinney.	310 Pine	st
Sierra Nevada S M Co.	Nevada.	76.	100.	Mar 29.	May 2.	May 21.	E L Lusk.	309 Montgomery	st
Silver Lick Con M Co.	Nevada.	2.	100.	Mar 29.	Apr 16.	May 14.	O Farrell.	SE Montgy & Wash	st
Tip Top S M Co.	Arizona.	1.	100.	Jan 28.	Mar 8.	Mar 29.	H Nielsen.	210 Front	st
S Maguel & La Trinidad M Co.	Mexico.	1.	100.	Jan 28.	Mar 8.	Mar 29.	H Nielsen.	210 Front	st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Buchanan G M & M Co.	California.	2.	05.	Mar 30.	May 2.	June 1.	P J Sullivan.	121 Post st
Lima Con S M Co.	Arizona.	6.	05.	Apr 4.	May 15.	Jun 5.	R D Hopkins.	436 Montgomery st
Lucky Hill Con M Co.	Nevada.	2.	10.	Apr 2.	May 4.	Jun 4.	H A Ulrich.	37 Ellis st
McJannet Con M Co.	California.	1.	20.	Mar 7.	Apr 9.	May 1.	E M Hall.	327 Pine st
McMillen S M Co.	Arizona.	5.	20.	Mar 8.	Apr 12.	May 10.	J Morio.	328 Montgomery st
Napoleon M Co.	California.	7.	10.	Mar 13.	Apr 10.	May 28.	H B Smith.	307 Montgomery st
San Pedro M Co.	Arizona.	8.	05.	Mar 6.	Apr 10.	May 2.	H Deas.	300 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Como-Eureka M Co.	Nevada.	L Hermann.	220 Sansome st.	Annual.	Apr 19
Uncas M Co.	Nevada.	C E Gillet.	303 Montgomery st.	Annual.	Apr 13

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bulwer Con M Co.	California.	W Willis.	309 Montgomery st.	05.	Apr 12
Contention Con M Co.	Arizona.	D C Bates.	309 Montgomery st.	25.	Apr 28
Jackson M Co.	Arizona.	D C Bates.	309 Montgomery st.	10.	Apr 17
Kentuck M Co.	Nevada.	J W Pew.	310 Pine st.	10.	Apr 19
Navajo M Co.	Nevada.	J W Pew.	310 Pine st.	25.	Apr 13
Northern Belle M & M Co.	Nevada.	Wm Willis.	309 Montgomery st.	50.	Apr 16
Silver King M Co.	Arizona.	J Nash.	315 California st.	15.	Apr 15
Standard Con M Co.	California.	Wm Willis.	309 Montgomery st.	25.	Apr 12

Table of Highest and Lowest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 21.	WEEK ENDING Mar. 22.	WEEK ENDING Mar. 23.	WEEK ENDING Mar. 24.
Alpha.	1 1/30	1 1/30	1 1/30	1 1/30
Alta.	33c	60c	40c	45c
Andes.	55c	65c	50c	60c
Albion.	50c	55c	10c	55c
Argenta.	50c	55c	60c	60c
Belcher.	60c	1 1/30	90c	60c
Balding.	3 7/8	3 7/8	3 7/8	3 7/8
Best & Belcher.	3 7/8	3 7/8	3 7/8	3 7/8
Bullion.	10c	10c	10c	10c
Bechtel.	5c	6c	65c	80c
Belle Isle.	5c	6c	65c	80c
Bodie.	10c	90c	85c	75c
Boston.	10c	15c	12c	15c
Butte Tunnel.	10c	10c	10c	10c
Caledonia.	10c	10c	10c	10c
California.	5c	5c	10c	20c
Challenge.	1 1/5	1 1/5	1 1/5	1 1/5
Cuddles.	1 1/5	1 1/5	1 1/5	1 1/5
Con Imperial.	10c	10c	10c	10c
Con Virginia.	45c	50c	45c	50c
Crown Point.	85c	1 1/5	1 1/5	1 1/5
Day.	10c	10c	10c	10c
Elko Con.	20c	20c	20c	20c
E. Mt. Diablo.	5 7/8	5 7/8	5 7/8	5 7/8
Eureka Tunnel.	1 1/5	1 1/5	1 1/5	1 1/5
Eschschuer.	25c	35c	25c	35c
Grand Prize.	25c	35c	25c	35c
Gould & Curry.	2 1/5	2 1/5	2 1/5	2 1/5
Hale & Norcross.	2 1/5	2 1/5	2 1/5	2 1/5
Holmes.	40c	45c	40c	45c
Independence.	40c	45c	40c	45c
Julia.	50c	10c	50c	10c
Jackson.	10c	10c	10c	10c
Kentuck.	10c	10c	10c	10c
Martin White.	25c	50c	25c	50c
Mono.	3 1/2	3 1/2	3 1/2	3 1/2
Mexican.	3 1/2	3 1/2	3 1/2	3 1/2
Mt. Diablo.	3 1/2	3 1/2	3 1/2	3 1/2
Mr. Potosi.	10c	10c	10c	10c
Noaday.	9c	9c	9c	9c
Northern Belle.	9c	9c	9c	9c
North Noaday.	3 1/2	3 1/2	3 1/2	3 1/2
North B. E. Lode.	45c	50c	40c	50c
Ozidental.	1 1/4	1 1/4	1 1/4	1 1/4
Opbir.	2 1/5	2 1/5	2 1/5	2 1/5
Oerman.	20c	25c	15c	25c
Potosi.	85c	1 1/5	25c	90c
Pinal.	1 1/5	1 1/5	1 1/5	1 1/5
Savage.	1 1/5	1 1/5	1 1/5	1 1/5
Seg Belcher.	1 1/5	1 1/5	1 1/5	1 1/5
Sierra Nevada.	2 1/5	2 1/5	2 1/5	2 1/5
Silver Hill.	10c	10c	10c	10c
Silver King.	10c	10c	10c	10c
Scorpion.	55c	60c	50c	55c
South Nevada.	10c	10c	10c	10c
Syndicate.	10c	10c	10c	10c
Tuscarora.	4 7/8	5 1/5	3 1/5	4 7/8
Union Con.	2 1/5	2 1/5	2 1/5	2 1/5
Utah.	2 1/5	2 1/5	2 1/5	2 1/5
Ward.	20c	25c	20c	25c
Wales.	20c	25c	20c	25c
Yellow Jacket.	1 1/5	3 1/5	2 1/5	3 1/5

Sales at San Francisco Stock Exchange.

THURSDAY, A. M., APRIL 12.	AFTERNOON SESSION.
20 Albion.	45c
310 Argenta.	60c
25 Alta.	30c
10 Alpha.	30c
200 Belcher.	75c
200 Bodie.	1 1/30
20 Coudence.	1 1/30
50 Crown Point.	1 1/30
30 Con Virginia.	2 1/5
250 Chollar.	1 1/5
10 California.	20c
4750 Day.	40c
15 Eureka Con.	4 30c
50 Exchequer.	20c
200 Eureka Tunnel.	85c
150 Grand Prize.	50c
505 Hale & Nor.	3 10c
20 Kentuck.	10c
70 Mexican.	3 1/5
303 N. Belle Isle.	25c
30 Northern Belle.	9c
140 Navajo.	10c
50 Overman.	20c
690 Opbir.	2 3/5
320 Potosi.	55c
50 Scorpion.	55c
10 S Nevada.	2 1/5
10 Savage.	2 1/5
100 Union.	3 7/8
50 Yellow Jacket.	2 50c

Mining Share Market.

Our stock tables above give what few fluctuations have occurred in mining stocks the past week. The only peculiar feature of interest has been the rescindment of the dividend of the Yellow Jacket Company. On the 4th inst. the company declared a dividend of twenty cents per share. Now, the trustees of the Yellow Jacket have rescinded the dividend, under the advice of the attorney of the company, who is of the opinion that the money in the treasury cannot be appropriated for dividend purposes, because it does not come clearly under the head of net earnings, from which dividends are only permitted by the statutes of Nevada, the Yellow Jacket being a Nevada corporation. This is the second time that the Yellow Jacket trustees have taken such action. It was in April, 1869, that the Board declared a dividend of five dollars per share, but a fire occurring in the mine soon after, the dividend was rescinded. The company had just paid three dividends in January, February and March, the same aggregating \$360,000. In January, 1869, the mine sold at \$1,375 to \$1,610 per foot. In the following February sales were made by the share. There was then 24,000 shares in the mine, and the first sale under the new system was \$77 per share. Since then the stock has increased to 120,000 shares. The dividend rescinded fourteen years ago this month, was followed three months later by an assessment of ten dollars per share, or \$240,000.

At the north end of the Comstock all the money expended is being placed where it will do the most good, and the prospecting done is being carried on at points where there is the greatest likelihood of striking something. This is, of course, gratifying to assessment-paying stockholders, who very naturally wish to see their money judiciously expended.

From the Gold Hill mines a large amount of low-grade ore is being extracted, and the aggregate is considerably increased by the yield from the Chollar croppings.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Richmond, April 4th, \$18,235; Hanauer, 3d, \$3,200; Ontario, 3d, \$3,842; Horn Silver, 3d, \$1,800; Stormont, 4th, \$3,430; Silver Reef (for March), \$45,411; Hanauer, 5th, \$1,750; Stormont, 5th, \$2,700; Ontario, 5th, \$1,303; Horn Silver, 5th, \$12,000; Lexington (for March), \$9,700; Hanauer, 6th, \$1,780; Ontario, 6th, \$4,360; Horn Silver, 6th, \$9,000; Bullionville, 8th, \$7,735; Horn Silver, 8th, \$12,000; Ontario, 8th, \$6,480; Northern Belle, 6th, \$7,099.17; Bodie, 9th, \$4,270; Bullion, 10th, \$1,900; Contention Con, 6th, \$55,488; Christy, 5th, \$2,490; Betty O'Neal, 6th, \$3,765, 9th, \$3,379; Mt. Diablo, 6th, \$5,097.95; Martin White, 4th, \$2,245.76; Northern Belle, 3d, \$17,045.59; Navajo, 9th, \$16,400; Odessa, 3d, \$4,128.50; Standard, 2d, \$10,484.77; Yellow Jacket, 4th, \$18,379.81; Pinal Con, 27th to 2d, \$7,636.29.

DYSPEPSIA, heart-burn, nausea, indigestion, etc., are always relieved by Brown's Iron Bitters.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

DRYTOWN.—Amador Ledger, April 7: We learn that the mining outlook in the vicinity of Drytown is very encouraging at the present time. The Seaton mine is looking unusually well, and the Loyal lead and the Potosi mines, which have been idle for some time, will soon resume operations. The Loyal will start up next week and the Potosi in about a month.

BUNKER HILL.—It is pleasing to be able to report continued improvement in this mine. A body of ore has been encountered on the foot wall, which promises to lift the company out of debt in time. The ledge is said to be 10 ft wide; the milling portion of it we understand, is from 5 ft to 6 ft in width. By working only this pay rock, which at the lowest estimate is expected to yield \$6 per ton, a fair profit can be realized. Ten stamps of the mill, were in operation in the early part of the week, with the prospect of the number being increased to 20 in a short time. From 15 to 20 men are employed, and the force is being rapidly increased.

MISCELLANEOUS.—Rock is being hauled from the Vaughn mine to the Kelly mill, which will be started up in a few days. The rock in the Morgan tunnel continues to look well.

UPPER RANCHERIA.—Times have been very dull with us on account of the dry weather. The miners have done nothing all winter, and the farmers have been grubbing and growing; but the past few days their contentances have been somewhat changed on account of the rain, the blessed rain; and we will not complain any more now, if it rains till the Fourth of July. The miners will not get to do a great deal as the rainy season is so near over. The Blue gravel company commenced piling last Wednesday. The Hancock company also commenced operations last Tuesday. George Evans and brother have not done anything on their claim yet; are waiting for water to get through the Volcano ditch. These three mines are looking well, and prospect well, and would pay handsomely if water could be procured to work them the year around.

BUTTE.

HELLTOWN MINING SCHEME.—Butte Record, April 7: Pres. Longley, one of the oldest and best known miners on Butte creek, was in Chico the other day, and in speaking of the claims said that not much gold had been taken out during the past year, because of the scarcity of water to work with. There has been enough rain, but as there was no way to confine it, it all ran off into little mountain streams before any use could be made of it. Mr. Longley says that there is untold fortunes in the golden metal hidden away in the bowels of the earth about Helltown, but the miners are powerless to reach it. They are poor, and cannot convey water to the proper spot. Several years ago large sums of money were spent in building the Shepherd ditch, which tapped Butte creek for the purpose of carrying water into the claims. For a time this enterprise proved of vast value, but it was not properly constructed, one of its faults being that it was dug too deep, and now it was almost abandoned. Mr. Longley said that an effort was being made by the miners to induce some capitalists to construct a flume or ditch to take water from old Butte creek to their mines. The intention is to take their stream from the head waters of Butte creek, some 20 miles away. It would cost a little over \$1,000 per mile to build a flume but the miners feel confident of striking a rich deposit, as it is a well-known fact that the Helltown hills are filled with the purest gold.

CALAVERAS.

HURT.—Mt. Echo, April 5: Henry Kirkpatrick, a miner employed in the Gold Cliff mine near Angels received several severe cuts on the head by falling stones, on Saturday last. It appears that he was working under a bank some 30 ft high, when a small cave took place at the top of the bank. Mr. Kirkpatrick saw his danger and attempted to run out of the way, but was struck by a sharp stone of several pounds weight, and injured as above described. Dr. Baker dressed his wounds, and he is doing as well as could be expected. Perhaps the richest strike but one in this county within the past 20 years, was made on Tuesday last by George Osborn and son in the Gold Hill mine some two miles west of this town. This mine was first discovered about 26 years ago, and there have been large sums taken out from time to time; but the late discovery is the richest of all. A specimen of the gold taken out on Tuesday was exhibited at our office the same day, the weight of which was about 12 ounces. It is reported that \$2,000 was taken out in one hour on the day of the discovery and that thousands of dollars were still in sight. In fact, it is simply immense. A further description will be given next week.

MURPHYS.—James Moss has just made a run of 20 tons of quartz from the Eddie Dewitt mine, which is a property belonging to your humble correspondent. As there was much speculation in regard to its worth, and as the inert brain of street corner experts, quartz sharps, etc., were unduly exercised in the momentous question. I thought it my duty to make a public statement and relieve the strain on the afore-said experts, etc. The gold for the most part was very fine, and, of course, much of it escaped; as was proven by assay of the tailings. Mr. Moss stated that in all his experience he never made a run where there was so much extremely fine flour gold saved. The rock paid a trifle over \$8 per ton in full gold; tailings asaying \$12 per ton, makes the rock worth \$20 per ton by the Oro Plata Co.'s process. This must be the minimum rate; for the sulphurets by stamp treatment are pulverized so fine that much of it escapes on the surface of the water. Here is an argument in favor of pulverizers. We earnestly hope that this result so satisfactory to me, may be so to the curious; and that the wheels of our little but mighty world may be set in motion again. The Boston Co.'s mill is running steady on Red Wing ore with good results. The capacity of the chlorine works is pushed to its utmost capacity in treating the second class concentration. The first class concentration of which a number of tons are saved and which assays in the thousands, are reserved for special treatment. Another pulverizer will soon be added which will make the capacity of the mill 30 tons. Mr. Macnevin, of the Washington mine, has returned

from San Francisco. His mine is looking splendidly, I learn from McCullum, the foreman of the mine. There is a large force of men at work in the mine now.

EL DORADO.

VOLCANOVILLE.—Cor. Georgetown Gazette, April 7: The new mill on the Josephine mine started up about a week ago. The old steam mill which stood just on top of the hill, overlooking the river, was taken down by the company in the early part of the past winter, and a new one put up down on the side of the hill towards the river, 200 or 300 ft below the old one. I visited it a few days ago, and found it working splendidly. They have only as yet, 10 stamps running, but intend to put up to more in a short time. The mill is run by water power, 32 ft pressure and a Knight's wheel. It is fitted with all the modern improvements, such as self feeders, rock breaker, etc. About 25 inches of water is used to run the 10 stamps. Everything in and about the mill seems to have been done in a good and substantial manner, and reflects credit upon the workmen, Messrs. Rauney, Copp and Goodpasture. A tunnel enters the mine about on a level with the top of the mill, and as the ore is brought out, is dumped into the bin at the rock breaker, in and near the top of the mill; one man tends the rock breaker, and that was about all the work I saw being done about the mill—improved machinery does all the rest. Work in the Cooley mine is progressing satisfactorily. This is the old Grizzly Flat claim; it has been bonded by a San Francisco Co., who are under the superintendency of George Bower, running a bed-rock tunnel; they intend, in about another month, to "chimney up," when good pay is confidently expected. The Spring tunnel claim up at Mt. Gregory, 2 1/2 miles above here, has been fitted up during the past winter with a hydraulic rig; has been running about a month; have not yet made a clean-up. This is also a San Francisco Co. C. F. Lloyd is working in a bed-rock tunnel on Bunker Hill, one mile east of here. D. C. Webster, on his claim on the Grey Eagle trail, has just raised a chute 20 odd feet, and got through into gravel. Your correspondent is still pegging away in his bed rock tunnel—thinks "there's millions in it." So you see, there is considerable prospecting going on around here, and we think some of us, if not all, ought to strike it. We learn that Jordan & Zombro are now in 150 ft on their large tunnel which they are driving to tap their ledge on Slate mountain. They have not much farther to run. The ledge prospects well for a long distance on the surface, and a shaft of nearly 100 ft sunk on the ledge last season, demonstrated beyond doubt that they have a valuable mine of milling ore. Therefore they are driving in a tunnel suitable for working the mine on an extensive scale. Mr. Benjamin and the Grover boys own an adjoining claim on the same ledge, and are in some way interested in the tunnel. This is one of our new mines which will have a mill put upon it before another year.

MONO.

HOMER DISTRICT.—Homer Mining Index, April 7: The Lake Canyon toll road, between the May Lundy mill and tramway, had been nearly cleared for teams, the tramway and mill put in repair and everything was about ready for putting on a large force of miners, when the heavy snow storm of last week came along and to temporarily checked the movement. The May Lundy mine was never in better condition, and never showed larger quantities or richer ore than at present, and it is confidently believed that the bullion output for the current year will be largely in excess of that of any preceding year in the history of this famous mine. A force of men will be put on this morning to reopen the road, and, should the weather continue fine, the mine will be started up full handed in a few days.

GORILLA.—All three of the tunnels in the Gorilla mine are being steadily pushed along the vein, in ore. The lower tunnel, No. 1, is in 480 feet, the header being 112 feet the center of the upraise which connects it with the tunnels 2 and 3. The additional 100 ft will be added to the upper end of the tramway as soon as the snow will permit, when the mine will be in the best possible condition to pour out a large and steady stream of gold.

MONO LAKE HYDRAULIC.—The 5 ft and 2 inches of wet, heavy snow that fell in the hydrographical basin of Mill creek last week will be of incalculable benefit to the Mono Lake Hydraulic M. Co., as it gives assurance of an abundant supply of water for the season. The company can now put on a full force of men, and will doubtless push the work with redoubled vigor.

GREAT SIERRA.—Tioga—Work is still progressing in the crosscut adit of the Great Sierra mine, Tioga district, but as the company appears to have been financially embarrassed for the past five months it is not known whether or not it will be able to procure machinery of sufficient capacity to drive the adit to the Great Sierra or Bevan lode, its objective point, or whether it will complete the wagon road (begun last September) up the western slope of the Sierra—a prerequisite to the transportation of heavy machinery.

NOTES.—Work is steadily progressing on the Mount Gibbs group of mines, south end of Tioga district, but during the week the working force in the mine was reduced from 12 or 14 to 4 men.

James Moore, of Toledo, Ohio, who spent the greater portion of the summer of 1881 in Tioga district

ganization. We would not be at all surprised to hear that the company would produce enough ore to pay expenses from the first month of its operation. The Valley View mine was heretofore called the "Whisky Diggings," and was worked by Geo. D. Roberts and Harpending for gold, in other days.

RICH COPPER ORE.—Weisslein Bros. have, at their banking house, a number of specimens of rich copper ore taken from a claim in the foothills of Placer county south of Bear river. The specimens embrace gray ore, black oxides and chlorides, and an assay by J. J. Ott, of Nevada City, of the average quality shows them to go 56 in pure copper. The claim from which these rich specimens come has been purchased by the Messrs. Weisslein and other parties within a few days.

THE LITTLE BONANZA.—After an interval of several months Nichols & Co., yesterday resumed work on their "Little Bonanza" claim, to the west of town, and expect before long to be taking out more rich specimens. The water is being pumped out of the drifts, and it is intended to work deeper than before. When work was stopped before on account of the wet weather good pay rock was left in the drift. Six men are at work on the claim.

PLACER.
RAISED WAGES.—Cor. Placer Herald: The Hidden Treasure Co. raised the wages of their employees from \$2.50 to \$3 a day. This is the voluntary act of the owners, and it took their men by surprise. These gentlemen well deserve the rich mine they own. May it continue to pan out better than it ever has.

A GOOD RUN.—Placer Herald: Messrs. Peardon & Hawkins brought to town, last Thursday, 200 ounces of gold, the result of a run of 135 tons of ore from their mine, the Morning Star. The ore for this run was taken from three different places in the mine and shows the high average of \$20 per ton. The Peardon & Hawkins brothers have been working this ledge now for several years, and it has paid them well from the start. They have a good mill, steam hoisting works, and a well opened mine, and all has been paid for from the proceeds of the rock.

PLUMAS.
TAYLOR-PLUMAS.—Greenville Bulletin, April 7: The mill has been busy night and day since a start was made, over three weeks ago; most of the ore crushed has been taken from the dump. Mr. Bransford started a shaft to tap the ledge close to the mill, but was compelled to suspend work upon it soon by the storm; drifting eastward from the winze in the tunnel is continued, so that when work in the shaft shall be resumed, and the ledge reached, there will not be any great delay in opening from the shaft to the winze drift. The ledge is opening out in this drift fully up to what had been expected.

WATER PROSPECTS.—Rain set in on Sunday, a week ago; the storm continued all the week with but little cessation, alternating between snow and rain. During one twenty-four hours the water in Round Valley reservoir raised about six feet, the streams pouring in torrents from all sides; this was before any snow had fallen, and when the area to be covered was not so great as it has since become. The water still keeps raising steadily; on the mountains around there is a depth of about two feet of snow, very ample, with the rains we are now certain to get, to give a full supply for the summer. Before this storm set in the outlook was discouraging enough, but now every one feels jubilant, and confident that we will have a prosperous and profitable season, both in mining and farming in the valley.

GREEN MOUNTAIN.—The mills have been kept running steadily during the past two weeks, and been well supplied with ore of a fair quality. A few hours delay was caused last week by a break in the ditch, but this was a trifling matter and would not make any change worth mention in the result of the month's work. The tunnel is advancing rapidly, and will certainly reach the ledge toward the end of the month; this will make a very important change for the better in the condition of the mine. From what is already known of the ledge in the upper levels it may confidently be expected that a very large body of good paying ore will be opened up in the tunnel.

EAST OPHIR.—This is the name applied to the location made at Crescent by C. H. Higbee, and upon which a shaft is in process of being put down; the shaft is now down 85 feet, but work had to be suspended last week soon after the storm set in, owing to a great increase in the flow of water. Before any more work can be done a pump must be put in, for which preparation is already made. At a depth of 55 feet a ledge of good looking ore was on one side of the shaft, no effort was made to test the extension of the ledge, but as soon as the water shall be pumped out a crosscut will be started and the width and quality of the vein fully tested.

EMERALD DISTRICT.—A brief suspension of work was caused last week in the tunnel on the Lucky S. mine, but work is now going on again all right. A heavy stream of water was encountered in the face of the drift a day or two ago, and this with other indications, proves that the ledge will very soon be reached.

INDIAN VALLEY MINE.—At the Indian Valley mine, the use of steam was discontinued this week except for hoisting. This mine is the only one in the district provided with steam power so that when the supply of water fails the engines can be started up and work continued as usual, both in mine and mill.

GREEN LEDGE.—The arastra at this mine was started two weeks ago last Monday; at the end of the first week a clean up was made, and an amount of gold obtained that would seem to warrant the building of a mill.

GENESSEE MINE.—The Genessee mill was started up for the season two weeks ago last Monday, and has since been running steadily, day and night, on good rock.

SAN BERNARDINO.

BORAX MARSHES.—Calico Print: Besides the large borax fields owned by the Seares Bros. and W. T. Coleman & Co., in Death Valley, there are also other localities in this county that have been taken up by other parties. About eight miles southeast of Hawley's station, at Coyote Holes, there is a marsh of two or three hundred acres, surrounded with an immense deposit of borax. The marsh is chiefly a large deposit of carbonate of soda. The borax is almost pure, of a fine quality and known as cotton-ball borax. It is necessary, in order to reduce it to a crystallized form, to mix with it fifteen

per cent. of carbonate of soda, which nature has, it seems, placed there for that purpose. The best part of this marsh has been located by Wm. Curry, E. J. Miller and O. H. Baker. The property has been bonded by the James brothers for \$12,000. Borax is worth thirteen cents a pound in San Francisco, and it is not very expensive to reduce the borax, so that the parties interested are likely to make some money out of the enterprise. Daggett station is the nearest shipping point, which, fortunately, is not as far from this borax deposit as it is from others.

SHASTA.
WHISKYTOWN.—Cor. Shasta Courier, April 7: In our last issue, Kesler & Andrew were represented as having sold their mine for \$1,000, when in reality they have bonded it to San Francisco parties for \$4,000 for 60 days, \$1,000 being paid as a forfeit. J. D. Blair, A. Saulan, W. Andrews and W. E. Hopping have bonded their mine to the same parties for \$4,000. I. W. Zent has been engaged as superintendent and will soon put a force of men at work. The grand old rain has caused a jubilee among the miners; Kesler & Andrew have started their arastra once more and the Mad Ox mill has again resumed operations, where, according to Mother Rumor, a large force of the moon-eyed Chinamen will be employed, to already being at work there. The placer miners are making the dirt fly. The locating of quartz claim epidemic has broken out here, and the fever runs high, also all of the male portion of the community having it in its most malignant form.

SIERRA.
KEYSTONE.—Mt. Messenger: Geo. Jordan has been working several men at the Keystone during the winter. He will make a run of the mill as soon as he gets water. The Ruby Co. are getting good pay at the South end of their works. All the mines at Eureka now have a good head of water, and are in full blast.

TRINITY.
RUNNING WATER.—Trinity Journal, April 7: After many days of waiting and a number of days spent in cleaning out the main ditch, Mr. John Yule tells us that he commenced active operations in the Bolt Hill claim on Saturday last. He now has strong hopes of a fair Spring and Summer run and believes that if such is the case the mine will make a splendid showing. At the McGillivray property, the hydraulic elevator is in full blast and doing good work. Mr. Yule thinks that between running gravel down hill in one mine and running up hill in the other he ought to make a glorious success.

TULUMNE.
THE MINING BOOM.—Mountain Democrat: A pioneer and prominent resident of Mud Springs township writes as follows, under date of April 3: "The chief mining boom of this season will certainly be in the vicinity of Mud Springs. Recent developments prove the Greenstone lode to be one of the curiosities of the time. It is extremely rich in gold, and is known to extend for miles. It is a fissure vein on the west side of the tale, with granite for a foot-wall. Several companies have sunk upon it from 10 to 100 feet, and all of them have found deposits that paid from \$10 to \$200 to the pan of free gold, besides from two to four feet of good milling ore, and the deeper they go the better it gets. The pay appears to be uniform; in fact, it is a continuous vein of gold through the center of the great gold-bearing belt of the State. As for quartz, we believe and know we have some of the best in the State. The celebrated Amador or Hayward lode passes right through here, in its virgin condition, awaiting capital for its development. The 'Davidson mine' upon said belt has been tied up for over 30 years, in the hands of men without means to work and develop it, but Peter Gross, the indefatigable and successful prospector, has succeeded in bonding it, and is rapidly completing a ten-stamp mill, with which he will soon test its value. He is highly elated with the formation and prospects, and claims that he will have one of the most permanent and best paying mines in the State. There are eight or ten other claims on the same lode in this vicinity, all of which prospect well in free gold, upon which capital would be expended, mills built, and work actively prospected, if Gross' venture should prove successful.

RAPPAHANNOCK.—Union-Democrat, April 7: Work on the Rappahannock mine, near Rawhide, is progressing finely. A new boiler has been added to the works. The shaft is down 190 feet in ore that looks well. This week it was expected to commence crosscutting with every prospect of getting rich ore. Richard Chute recently bought into the mine which has been incorporated. This work of development will be pushed with the promise of profitable results. The same owners will also commence work immediately on the O. K. mine, situated on the same vein below the Rappahannock.

THE LAMPHEAR MINE. a northern extension of the Confidence, was sold this week to Richard Chute and J. A. Davis. The purchasers made arrangements immediately for putting in hoisting works and fully opening the mine. A rich chute of ore shows from the surface, down to the depth of 30 feet, deep as it has been opened, running 60 feet on the vein. Assays made from different parts of the vein go to a high figure. A quantity was tested by the milling process and yielded \$43 per ton. This is believed to be the chute that was hunted for in the Confidence mine. On the 800 level of that mine a drift was run a long distance to find it, but the search was stopped by water, which came in such quantities it could not be handled. More than a million dollars was taken out in the Confidence from the same character of ore. There is every reason for believing the Lamphear will prove to be similar to its predecessor in richness. That the gold is there, miners have no doubt, and the energetic parties that now have taken hold of it will leave nothing undone to get it, thereby enriching themselves and benefiting the community at large.

OAKLAND MINE.—Tuolumne Independent, April 7: This mine is situated about three and a half miles east of Columbia, Tuolumne county, in the richest mineral belt traversing the State, being adjacent to the celebrated Arnold mine, Read mine, Page mine, and other valuable mines. The ledge was discovered something less than a year ago, by Merritt Ham, one of Tuolumne's pioneer prospectors, and shortly after purchased by an Oakland company. This Co. have rapidly pushed the work toward developing the mine since coming in possession of it—having run a level on the lode 300 feet, and sunk a shaft 160 feet. A large percentage of the vein matter produces high grade ores, the gold seeming to be quite evenly disseminated through it. A new mill has been placed on the mine for the reduction of ore, and is

now in readiness for operation. Instead of a stamp mill the company, in order to economize, in a measure, in expenditures that necessarily occur in making a fair test to determine the value of ores through the ordinary milling process, have in place the Tustin Pulverizer, the first mill of the description introduced into the county. The inventor claims this pulverizer to be equal in working capacity to an ordinary five-stamp battery, and less than one half the cost of stamps. We shall look forward to the working results of the Tustin Pulverizer with the greatest interest. The company have in place, also, in connection with the pulverizer spoken of, Huntington's Improved Separator and Concentrator, combined, which machine seems to produce every result claimed for it by the patentee. The writer witnessed this machine in operation Thursday last, and, judging from its modus operandi, is as near perfect as machines of this description, aiming at one and the same purpose, is likely to reach for some years to come.

Nevada.

ARABIA DISTRICT.

SHIPPING ORE FROM OREANA. H. G. Wingate informs us that George Lovelock is shipping ore from one of his mines in Arabia district, east. The ores of Arabia are principally argentiferous galena, some of which contain a high percentage of lead, and from \$60 to \$150 per ton in silver. Two earloads of the ore is now being shipped east, and if it pays it is said a earload a day will be shipped.

CORTEZ DISTRICT.

BULLION.—Silver State, April 4: Yesterday, Wells, Fargo & Co.'s Express took west 16 bars of bullion, of the assayed value of \$24,615.82, from S. Wenban's mine in Cortez district. The mine which produced this bullion, and the district in which it is located, is the oldest in eastern Nevada. The machinery for the mill was hauled over the mountains and up the Humboldt in 1865, when the Indians were on the war-path. Cortez is situated southeast of Beowawe, in Eureka county, about 25 miles from the railroad, and it is said that Chinese labor is exclusively employed by Wenban.

RELIEF DISTRICT.

DEVELOPING.—Silver State, April 4: Edwin Darrow, who is engaged in mining in Relief district, on the east side of the Humboldt range, was in town yesterday. He represents the Batavia & Pacific M. Co., and is engaged in developing what was known as the Relief mine, which the company purchased some years ago. He is engaged in running a tunnel, which is now in about 300 feet, to the lead. Some years ago this mine produced some \$60,000, and carried exceedingly rich ore, some of which was shipped to Swansea, in Wales.

Arizona.

PRESCOTT NOTES.—Courier, April 7: J. M. Roberts is our authority for stating that the Copper Mountain mine is a big fellow. A town is growing up around it. T. J. Eaman has given the Courier permission to say that the Black Warrior mine will soon be giving employment to a great many men. The Franklin mine, in Turkey Creek district, is opened by shaft and tunnel. Ledge looking well and yielding a great deal of rich rock. C. D. Brown has gone to fix mining machinery in Turkey Creek district. J. A. Robinson says the Belle mine is yielding lots of ore. Gov. Tride thinks well of the Lynx creek hydraulic diggings. It is reported that the Howell Reduction Co. will soon have two more smelting furnaces. The tunnel in the Franklin mine, Turkey Creek district, is in a distance of 202 feet. The ore is said to be good. Openings are being made above and below this level. Dr. Farnham, superintendent of a small mill and some mines, in Walker district, came to town yesterday. His mill is the common stamp mill. It has been running upon ore from the Wadleigh. The recent call for an assessment on Tip Top stock has had the effect of making a few timid holders of the stock give credence to the report that the mine had petered. We learn from Messrs. Al. Whitney and Jake Marks, who have recently returned from the mine, that it has some \$75,000 worth of ore in sight and is looking as well as at any period of its existence. The depth attained by the present workings necessitates, however, the erection of better hoisting machinery, and it is to secure this machinery that the present assessment is levied. The Clip mill, of Silver district, drops his stamps for the first time in its history to-day. This mill and the Clip mine, which is run in connection with it, are owned principally by Messrs. Bowers, Shipman and Hubbard, and from reports received of its richness and extent it promises to be one of the leading mining properties of the Territory. So far as good management may tend toward the accomplishment of this result the property could not be in better hands than those of the gentlemen named. Mining experts speak in high praise of Henry Wickenburg's Iconoclast mine. It is a matter of regret that so good a property should not, however, be worked to the extent its merits require, the present holders lacking the requisite means to develop it quickly.

GOLDEN RULE GROUP.—Tombstone Republican, April 7: Notwithstanding the frequent outbreaks of hostile savages and other causes which have conspired to retard the progress of this section of Arizona, the well known richness of our mineral resources is having its legitimate effect; and despite the drawbacks referred to, Cochise county is slowly but surely taking rank as the most desirable place known for the investment of capital in mining enterprises. The Golden Rule group of mines are located two miles east of Dragoon Summit. They have been opened by various cuts and shafts, the deepest workings being only 175 feet in depth. The ore bodies thus far uncovered are said to be of vast extent, while it is claimed by those well informed in regard to the properties, that careful assays give an average return of \$60 per ton in gold. A syndicate of Silver City, N. M., capitalists have secured control of the Golden Rule mines, and from the manner in which they have commenced operations, it is probable that before the summer is past, regular shipments of gold bullion will be made. A 20-stamp mill has been ordered, and will be on the ground about the 10th proximo, grading for the mill site having already begun. The promoters of the enterprise confidently expect to have the mill running by August 10th. Water will be obtained from springs in the Dragons, seven miles distant, a substantial pipe-line furnishing

the necessary conduit to the mill. C. P. Crawford, the well-known banker and capitalist of Silver City, is president of the company, and Henry Booth secretary. The resident agent at the mines is Samuel H. Eckles, whose name will inspire confidence in the success of the undertaking. The stock is all held by residents of Silver City, with the exception of a small amount held by W. A. Farish, and none of it is for sale. It is the intention of the company to work the mines legitimately, and not as a stock-jobbing scheme. Those principally interested are practical mining men of many years experience, and they are serenely confident of the extent and richness of the properties over which they have secured control.

DELPHINE.—Final Drill, April 7: Mr. Deutch is working the Delphine mine, near the Surprise. The shaft is down about 80 feet, the drift from the bottom of the shaft is about 60 feet and the ledge will soon be reached. The ground is easily worked. But little blasting is required.

The machinery of the Queen Creek smelter has been overhauled and is now in complete working order. They are sinking for water, close to the creek. They are down 24 feet in a layer of clay and are now curbing. After that, the sinking will continue till the clay has been cut through, and a large body of water is expected. A considerable supply of ore is on the ground and they are hauling ore daily. They are waiting for coal and coke.

New Mexico.

MINING NOTES.—Southwest Sentinel, April 7: Nearly every pan of sand taken from the bed of the Rio Grande river shows at least one color of gold. A rich strike is reported to have been made in the Coyote district, Lincoln county, which is said to assay as high as \$1,600 is gold. The 10-stamp mill on the Occidental, in the Black Range, is pounding away and the results are all that was anticipated. The La Plata mines, next to the Hard Scabble, in the Magdalena mountains, is located on the same vein, but appears to be richer in lead ores, though this feature may disappear with depth. The Black Knife mine, in the Black Range, is now being worked by Illinois capitalists, under the superintendency of Col. Noulton. The lode is worked to a depth of 123 feet. The vein matter below the 100 level greatly improved, and a 10-ton smelter has been erected on the Cuchillo Negra creek, two and a half miles distant from the mine, and a good wagon road graded from the mine to the mill.

Montana.

THE POSER.—Inter-Mountain, April 3: The lessees of the Poser, Dennis Leary & Co., are meeting with splendid success in the development of the property. From the bottom of the shaft, which is 80 feet deep, a drift is being run on the ore shoot and a breast of ore 10 feet wide is being extracted. With a force of only five men, the product is made to average 15 tons a day. It is being shipped to the Silver Bow mill where it pulps from 32 to 38 ounces. The Poser shows one of the most extensive ore bodies in the camp, and the fact that there is scarcely a wagon load of waste on the dump is evidence of its uniform milling quality.

The indications point to a big output for the Alice company this month. The mills are in fine running order, and the Magna Charta never looked better. The 100 level of the Alice is also good for 25 tons a day, and barring accident \$100,000 is what the Inter Mountain estimates the product of the company for April will be.

Utah.

STAR DISTRICT.—Salt Lake Tribune, April 5: From persons in from the south we learn that in the Star district, which lies 12 miles southwest of Frisco, the prospect is bright in mining matters. The Kanarrab mine, owned by Sloan & Kemple, has reached a depth of 230 feet and is in galena ore three feet wide, which assays about 50 ounces silver, and from 60 to 70 per cent. lead. They have a slope extending upward 128 feet. The ore being extracted is sent to the Frisco smelter. The Stalwart, owned by W. S. and P. S. Martin, has reached a depth of 210 feet, at which point the vein is about 12 inches wide, the ore being argentiferous and horn silver with a quartz gangue. As depth is gained the quality of the ore improves. Eight years ago the owners sunk a shaft to a depth of 60 feet, and dug out all the ore to be found. It looked as if the property was worthless, but the owners showed their faith in it by going 50 feet north and sinking a new shaft. The first 75 feet, the thin vein of ore averaged 200 ounces silver, below which point it has been getting better and now assays 520 ounces silver, \$10 in gold and about 35 per cent. lead, and the vein is unbroken. Some of the other claims in that locality give fair promise, and persons interested in the Star district feel buoyant over the outlook.

A REVIEW.—Salt Lake Tribune, April 8: The output of the Horn Silver for the week was 24 cars of bullion, of the value of \$72,000. Previous shipments for the present year, \$886,500; present aggregate, \$958,500. We here no more of the cave hindering present work and the plentiful extraction of ore. The rich strike newly reported is in a portion of the mine not affected by the giving away, and at any rate the huge product of the mine is undiminished by the mishap. The Ontario shipped for the week, 44 bars of silver, valued at \$44,585.71. All is going well, the dead work progressing in good shape, and the ore bodies being entirely satisfactory. Undoubtedly, dividends must be resumed very soon. The Crescent Co. is reported to have made arrangements for large shipments of ore to this city, which will begin as soon as the roads get in passable condition. The Mammoth is not in the satisfactory condition that was to be wished. When work stopped by reason of the lapse of pay-day, the laborers held possession of sundry of the property of the company as security for their wages; but they subsequently released all this and went to work. But the manager, who was expected shortly with funds to square accounts, has not yet returned. Full confidence, however, is felt that the outcome will be well, for the progress of the work has developed not only the sufficient richness of the immense bodies of ore in the mine, but the entire practicability and paying character of the matting operations. The Frisco Co. shows shipments this week of one car of bullion, of the value of \$2,009.14. In all directions, the mining outlook was never more promising than it is the present season.

Prospecting for Gold and Silver.

The following is from the Salt Lake *Tribune*: For the thirty-fourth Spring in the camps of the Pacific Coast the prospectors are fitting out for the discovery and occupation of new ground. At first the limit was Nevada, Sierra, Plumas, Butte, and Placer counties in California. With another year Siskiyou was reached, and all the long line of hills from Mount Shasta to Mariposa. It was then so many colors to the pan, so many dollars or ounces to the day with rockers. After awhile the long tom was invented and it was confidently told that with it a miner could double his work. Later a year or two the first great deal began in Mariposa, and still later an English company built a costly but crude quartz mill above Marysville, at Brown Valley. Sir Henry Huntley was in charge, and though he knew very little about quartz or how to save gold from it, he rode a magnificent blood horse and looked as though he might be familiar with all the chemistry of the rocks. Those were the days of wild spears, of fandangoes, of pack trains, and when in some little building a theatrical play was advertised, and when on the little 12x14 stage a girl in spangles appeared to sing or to execute a fancy dance great hearty shouts greeted her and the stage was showered with gold pieces. Those were the days of generous hearts and quick, sharp quarrels. The fashion of honoring murderers and hanging horse thieves was inaugurated then on this coast. With every year new mines were found and new improvements in working them were made. Those were the days when rivers were turned aside at great cost, and when, not unfrequently, just as the day for commencing to reap a reward corresponding with the outlay arrived, the rains came and all the labor and money expended were hopelessly lost.

In Calaveras, Amador, Nevada, Sierra and Plumas counties, quartz mining and milling grew to be a business, but it was uncertain; it was something which men knew nothing of, but the thought that if from the ore the precious metal could be obtained, it meant quick fortunes, such as Astor and Girard gathered through long years of toil, stimulated men to keep trying. Who ever thinks of Astor and Girard as rich men now? Those were the days of steamers, those were the days when letters from home were kissed and cried over as never letters were before. Then hydraulic mining was invented, and the hills with their shaggy pines began to bow before the new destroyer. Every Autumn the immigrants came in from the plains with the crowd, and as the settlements in the deep hills grew permanent, toll roads were introduced and stages and big teams; year after year the volume of gold with increasing millions rose and floated away to the East and became an infusion of new blood to the arteries of trade.

Those were the days of clipper ships, and every time a man went down to San Francisco from the hills, his story on his return never failed to include descriptions of some new ship which had come into port and which was more beautiful than any ship had been before. And gradually at the point of the Peninsula the sand hills melted away and a regal city took form inside the Golden Gate. But the placers began to fail; the beards of the early miners began to grow grizzled, and they commenced to grow garrulous when they talked of the winter of '49 and the spring of '50. A few of them tried farming, and when the river bottoms were tested the result was astounding. There was better wheat and more to the acre than the richest lands of the East could produce. Still, as yet, all the upper lands of the valley were flower crowned, and old miners did not take kindly to farming. Something new was wanted. So in 1857, when it was told that in British Columbia there were rich placers a new exodus began. The steamship companies fanned the flame and the exodus grew to be a stampede. It was short-lived, but it was fatal to many a trader of easy fortune; fatal to the future of many a miner, for thousands in that journey and search acquired the restlessness which never more permitted any contentment in this world. At last from beyond the Sierras a man carried some peculiar looking material to Placerville and was told there by Prof. Frank Stewart that it was black subphosphates of silver, and he advised the man to have it assayed when he reached Sacramento. The result was a return of \$1,400 to the ton. Then there was a new excitement indeed. Then the energy of the California mountains was transferred to the other side; then farms and gardens were left to camp followers; then the exploration of the desert began, and what has happened since is modern history. How the boys learned to timber them; how Idaho, Montana, Arizona and Utah were explored; how at length the locomotive came along, is it not all written in the chronicles of these days? But the prospector still haunts the hills; with every year he fixes his pack and blankets and starts for new fields with the old dream in his heart and the old eager look in his eyes. This year he means to bring up in the Kootenay country and he goes away with the determination that if he fails this year he will try Alaska next. His generation is almost gone, and his work is almost finished.

WOOD PRESERVATION.—M. Favol, a French investigator, has found that the cresote treatment for the preservation of wood sometimes doubles the durability of oak timbers used in collieries, but has little influence on pine. He further says that oak prepared with ferrous sulphate lasts ten times longer than in its natural state. It should be immersed 24 hours in a solution of 200 grammes of ferrous sulphate.

Is Cottonwood Timber?

The Government Land Office has decided that the cottonwood is a timber tree, and that it may be used in planting land which the settler wishes to acquire under the timber culture acts, and yet there are claimants who desire to acquire land with cottonwoods already growing on it under the timber culture acts. The Commissioner of the General Land Office has lately issued a decision in this matter, in which he says: Under the current rulings of this office, and the Department, the cottonwood is regarded as a timber tree, and cultivation of the same by timber culture claimants is accepted as a compliance with the law, so far as the quality of the timber is concerned. While it is shown by the testimony that this tree is not used to any great extent in the locality for manufacturing purposes, building, fencing or firewood, yet it appears that it is used for out-buildings, houses, fences and firewood occasionally, according to the notion or necessity of the settler, or the distance from timber of a superior

MONO COUNTY.—During several years residence in Mono county, and by extensive exploration and close observation, we have gathered a vast amount of interesting information relative to the early history, the geography, topography, geology, mineralogy, hydrography, scenography flora and fauna of that interesting and rugged portion of the high Sierra embraced within western Mono, northeastern Tuolumne and northern Mariposa, from Bodie to Yosemite and from Owens river to the confluence of the three main branches of the Tuolumne river—including the auriferous gravel range of Mono, the mining district of Jordan, Homer, Tioga, Prescott and Mount Hoffman; Mono Lake, its islands and coralline and volcanic surroundings; the principal mountain peaks in this portion of the chain, as Dana, Lyell (and its residual glacier), Castle Peak, Warren Discovery, Theller, Comess, Bill Williams, Gilcrest, the Minarets, Cathedral, Hoffmann, Cloud's Rest, and the domes about Yosemite and northward; the thermal, solfataric and other mineral springs; the great glacial gorges on both slopes, and other evidences of



THE ORANGE KATYDID AND ITS FOE.

kind. The cottonwood tree, as it grows in the locality, is, therefore, not either useless for the purposes mentioned, or merely ornamental. This is apparent from the evidence in the case. The entry is held for cancellation, for the reason that the land was not subject to timber culture entry, the same not being prairie land or other land devoid of timber.

LEAD POISONING.—The *Pioche Record* says: "Bullionville is undoubtedly the unhealthiest town in the State, as the many poor victims of lead poisoning can testify. It is an exceptionally dangerous abode for children, as they stand no show for recovery after the poison from tailings becomes permeated through their system, as was the case with two little ones that succumbed during the past few weeks." More arant nonsense than the above has never been put in print. The idea of one place being more unhealthy than another, as regards lead poisoning, is about the same as to say that poisoning by strychnine is more dangerous and deadly in one town than in another. Such English as: "After the poison from the tailings becomes permeated through their system," is enough to kill all the children and the majority of the adults, not only in the town of Bullionville, but for fifty miles around the place.

The Orange Katydid.

In his report on the orange insects of Florida and California, Prof. J. Henry Comstock introduces the drawing which we reproduce on this page. The insect is the "angular winged katydid"—*Microcentrum retinervis*. Katydid is generally harmless insects; but there is perhaps no insect of large size which is so destructive to the foliage of the orange tree as is the species named.

In describing the insect, we begin with the eggs, as shown in the engraving. Fig. 1 shows the female depositing her eggs. Prof. Comstock, in his report, remarks that the eggs (Fig. 1 a), were found to be laid in two ways. The first, as detailed by Prof. Riley, in a double row down a twig, which had previously been chewed with the jaws and otherwise prepared for a place of deposit. The eggs of each row were laid alternately, and those in the same row were deposited in such a manner that they overlapped, the first egg having been placed in a sloping position, and the end of the second forced down under the raised end of the first. Upon twigs this was always found to be the arrangement, but upon the leaves it was different. In the first place, there was but one row. This row was laid along the edge of the leaf, each egg obliquely towards the tip of the leaf, with its anterior end projecting beyond the edge, and its posterior border slightly overlapped by the preceding egg. The edge of the leaf was in no way roughened for the reception of the eggs, which were usually deposited upon the under surface. The shape of the eggs was a long oval, somewhat straighter upon one long edge than the other, and nearly flat, thickening somewhat as the hatching time approached.

With the leaf-laid eggs, the young katydid, in every case, issued from the end of the egg which projected beyond the edge of the leaf, and the empty eggs, with their split sides, were readily distinguishable from the sound ones, the difference appearing similar to that between a closed oyster shell and one partially open. The split is not confined to the external end, but also extends down the outside edges, which, by the way, is always the straight edge. With the double rows of eggs upon twigs, the straight edges of the two rows approximate, and it was from the upper end and inner border that the larva made its exit.

From eggs collected in Florida in February the katydids commence to hatch, and almost immediately began to eat, feeding at first only upon the surface of the leaves (Fig. 1b.) In about nineteen days they shed their first skins and ate them up before proceeding with their leaf diet. There were three molts in addition to this first one, the third giving them large wing pads, and the fourth making them perfect winged insects. The cast-off skins were eaten after each molt, and in one instance one of the katydids was killed and partly devoured by his companions while yet in the soft and helpless condition succeeding a molt. The quantity of leaves eaten by these creatures during their active period of growth was something enormous, and afforded a good index to the amount of damage which must be done where they occur in any number.

Fortunately for orange growers there is a chalcid parasite upon the egg of this insect, which seems to be quite common in Florida, at least. It may be known as the *katydid egg parasite*, as no other has been found, and as it is not known to infest other insects. The adult insect is a curious looking individual; the female (Fig. 2, the male Fig. 2a). It is about 13 to 14 of an inch in length, with dusky wings and with an abdomen which it can elevate over its thorax in a strange way. The eggs of this parasite are deposited within the eggs of the katydid, and its larvae hatch and undergo their transformations within the eggs of the latter, issuing at last as adult flies through circular holes (Fig. 2b) which they cut through the shell. There is never more than one adult parasite to issue from each egg, for although more than one parasitic egg may have been originally deposited in the egg of the host, only one arrives at maturity.

No better remedy for the injuries of this insect occurs to us than the collecting of the large and conspicuous eggs during winter. When collected, however, they should not be destroyed, but placed in a box covered with a wire gauze until spring, in order to allow the parasites to escape.

DESERT LANDS.—The Secretary of the Interior has decided that in the case of lands claimed under the desert land law, that the question of character of lands that have been reclaimed from a desert state, and are now producing crops by means of irrigating ditches, etc., are not subject to entry under the desert land laws. A desert land entry of 640 acres cannot embrace land in such form that the tracts in linear extent shall exceed one mile and a quarter. In entries of smaller quantities, the side lines must be reduced in proportion. A school section or part thereof cannot be embraced in a desert land entry.

A THROAT ELECTRIC LAMP.—At the last meeting of the Leeds and West Riding Medical-Chirurgical Society, Mr. Margetson, of Dewsbury, exhibited an incandescent lamp, designed by himself, and used by him since October last in examining the mouth and throat. The globe was about the size of a walnut. It can be held in the mouth for two minutes without discomfort from the heat.

THE STRASBURG CLOCK AND PLANETARIUM.

The late transit of Venus curiously proved the accurate calculations of the ancient makers of that famous horological curiosity, the Strasburg clock. A few days before the transit, the *American Register* tells us, visitors to the cathedral inspecting in the planetarium attached to the clock, noticed that one of the small gilt balls representing Venus was gradually moving toward a point between the sun and the earth, and on the day of the passage the ball stood exactly between them. Old Conrad Dasypodius, the Strasburg mathematician, superintended the manufacture of the clock and its accompanying planetarium some time between 1571-4, the dates differing according to various authorities; and it is interesting to note that after 300 years of existence the clock faithfully fulfils the calculations of its dead inventor.

Homer, Jordan, Tioga and Prescott Districts.

This (Homer) district is just now attracting a great deal more attention in the east than many of our own people are aware of. Capitalists there have ascertained in their own chosen way and time that the mines here rank with the richest gold quartz mines in the world, and the long continued improvement in depth of the May Lundy and Gorilla has definitely settled the question of permanency. These facts, coupled with the visits of mineralogical and crystallographic experts, indicates an active interest among eastern capitalists in the mines of this district, and we are assured that some heavy sales may be expected at an early day, to be followed by a period of active development work by companies possessing ample means. This is all Homer district requires to make it one of the heaviest billion producers on the coast.

In Jordan District, adjoining us on the east, the hydraulic mines have been put in good condition and active operations begun, though the water supply is still somewhat limited, owing to the frozen condition of the small tributary streams in the high Sierra. The Detroit Copper Company has for some time been engaged in straightening up its affairs and getting ready for active operations both in the mine and at the furnace. Some good developments have been made in heretofore unknown claims in Jordan District during the winter.

In Tioga District, adjoining Homer on the southwest, work progressed all winter, both in the Great Sierra tunnel near the north end of the district and on the Ella Bloss and Golden Crown group at the south end; though we are not advised as to the progress made or prospects encountered, further than that the Ella Bloss shows a large ledge of high grade silver ore.

Prescott District, next south of Tioga, and, like the latter, covering the summit and eastern slope of the Sierra, though containing many large lodes of fair grade gold and silver (milling and smelting) ore, is still lying idle, except when the silence is broken by the annual labor required by law. And yet Prescott will doubtless, in time, show up nearly as many and quite as productive mines as either Tioga or Homer. The base or carbonate belt of Prescott traverses the westerly portion of the district, in a southerly direction, from the head of Parker canyon, under the residual glacier of Mount Lyell, to the head of the North Fork of Rush creek, while the free ore belt (silver) crosses, with the same general trend, the easterly brow of the great eastern promontory of the same lofty mountain. During the winter, a group of mines on the carbonate belt, near the head of Parker Canyon, was sold to some California capitalists, who, it is understood, intend opening the mines and putting up a furnace as early this Spring as possible. Negotiations have also been going on for some time (with fair prospects of success) for the sale of a group of the best prospects of the eastern or free belt to an English syndicate, and altogether, it looks as though there was a "boom" in store for Prescott also, in the near future.

Below will be found some details of mining operations hereabouts:

Gorilla.

This mine is now in excellent condition for the advantageous employment of a large force of men during the present season, and must add greatly to the gold billion yield of this district during the year and thereafter. During the winter connection has been made between tunnel No. 1 and tunnel No. 2, 400 feet above, and as tunnels 2 and 3 had previously been connected by a 70-foot upraise, the mine is thoroughly well ventilated. Tunnel No. 1 runs in and along the ledge 475 feet, while at a point 350 above and 50 feet below No. 2, drifts have been run in the ledge both ways from the upraise—70 feet one way and 30 feet the other—both in fine ore. The vein varies from three to four feet in width, while the pay ore maintains a very uniform width of two feet throughout the various workings. A substantial three-rail tramway has been constructed from Wasson Valley 3,200 feet up the mountain side, leaving only 300 feet yet to be built to connect the lower tunnel with a good wagon road leading down one mile to the company's reduction works, which will next week be put in thorough repair for the reception and reduction of ore.

Mono Lake Hydraulic.

Work was resumed by the Mono Lake Hydraulic Mining Company some two weeks since, under the direction of Supt. Francisco Butler. Up to the present time there has been a scarcity of water, owing to the ice bound condition of the tributaries of Mill creek, but the flumes and sluices have been put in first-class order, and the big cut through the great gravel bed, extending from Mono lake up to the mouth of Mill creek canyon is being extended and got into such shape that it is believed the mine can be made to pay handsome dividends as soon as the higher mountains begin to yield up their winter storage of water.

HAIR BELTING.—In Germany, hair belting has been coming into use for some time, and is being quite generally adopted. It is said to give a rougher surface, with a surer clutch, and can be used of less breadth than either leather or rubber.

USEFUL INFORMATION.

How to Test Machine Oils

The *Druggist's Circular*, after alluding to the wretched quality of most of the "machine oils" in use, gives the following simple method of testing the value of such oils for lubricating purposes:

A good plan to test a lubricating oil is to take several kinds of the same article, one of which, being well known, may serve as a standard, and to place single drops of each in a line across the end of a piece of plate glass about twenty-four inches long, one end being six or eight inches higher than the other, to form an inclined plane. The drops of oil run down this smooth plane in a race with each other. The quality of the oils for lubricating purposes is shown by the distances traveled and the trace left by the drops. Thus, on the first day sperm oil will be found in the rear; but it will in time overtake the rest and retain its power of motion after most other oils have dried up. A light-bodied oil flows quickly, like water, but also dries quickly, whereas, what is needed is a good body combined with a limpid flow. Many oils have a good body, but have a tendency to gum; and this will be distinctly shown upon the glass. It is scarcely necessary to remark that the test slip should be covered from dust while the experiment is being made.

The above method will show the physical qualities of different descriptions of oil; but if the presence of acid is to be detected, another simple device may be adopted. In a sheet of bright copper a number of shallow pits are made by the blow of a round faced hammer. Samples of oil left some days in three dishes on a shelf in a warm room will show, by the formation of verdigris, where acid is present. The existence of a blue tinge of fluorescence in a glass phial of oil is frequently assumed to indicate the presence of mineral oil; but this is an illusory test since the same effect is frequently observed in the purest and freshest vegetable oils.

Be Careful.

A complete record of the number of persons who lose their lives, or are terribly maimed, by woodworking machinery in the United States every year would be a ghastly one. Almost every day the daily press tells of one or more accidents of this kind, and when the immense number of daily papers, each recording only such as occur in local establishments, is taken into consideration, the spectacle is an awful one to contemplate.

Whether or not all of these so-called accidents may justly be called accidents in truth, may be questioned. If a workman loses a hand or finger by sheer carelessness, he is hardly entitled to the privilege of calling his misfortune an accident. Indeed, it has been held by profound thinkers that there can be no such thing as an accident. Machinery builders may claim that with their machines it is next to impossible for the operator to be injured, but the truth of the matter is that no machine was ever designed, nor ever will be, that will not quickly resent any undue familiarity with it while in motion. Probably the majority of machine operators are injured by allowing themselves to become careless. Having run the machine a year or two, all thoughts of danger in connection with it are banished from the operator's mind, and in an unguarded moment he loses a limb or his life by the machine he thought he knew so well. Wood-cutting machinery must of necessity be driven at such high velocities, that nothing short of eternal vigilance will ensure safety, and even this can not be relied on. No man should ever trust a machine. If it gets him in its power, neither entreaties nor tears can save him. It has no pity, no remorse. It will chew up a new man every day in the week, and still hum away busily and contentedly, waiting for more. No person who runs power machinery is safe. The best he can do is to keep his eyes and ears open, his brain clear, and his thoughts strictly on his business. Be careful!

WHAT IS SOAP?—Soap consists of an alkali in combination with a fatty acid. The alkalies principally used in soap manufacture are soda, potash and ammonia. The acids are chiefly oleic, stearic, palmitic and margaric. Soda forms the hard soap, potash the sweet or soft soap, and ammonia the kind of soap used in medicine, technically called liniment. Soda soaps will vary in hardness according to the acid employed. Stearic and margaric acid yield harder soaps than the oleic and palmitic. Soap, although it is of so much importance, is not a very reliable compound. Soap may, by dexterous management, be made to contain eighty per cent. of water, and twenty per cent. may be considered a minimum, and forty per cent. an average amount, it is no wonder that various results are obtained from apparently the same material. Various samples of commercial soap are found to contain the following substances: Glycerine, silicate, sulphate, chloride and carbonate of soda, rosin, gelatine, Fuller's earth, Cornish clay, ground flints, potter's slip, farina, dextrine and other substances.

VENEERING is said to have originated with the art of cabinetmaking, and was used by the Egyptians 2,300 years ago.

A BULLET-PROOF CURTAIN.—Experiments lately made at Liepsie with a cuirass made of steel, the formula of which is not stated, indicate that the new material combines both tenacity and durability in the highest degree. The steel plate of the cuirass in this case was only .06-inch thick, and lined inside with a layer of wood; and eleven rounds from a Martini breech-loading rifle, fired at a distance of 175 yards, only two of the bullets pierced the metal, and even these were completely flattened and stuck in the lining.

BEATEN ALUMINUM LEAF may now be obtained in books, like silver leaf, and is largely used instead of silver for decorative purposes. Mr. Levison suggests heavy aluminum leaf as a substitute for tinfoil for coating Leyden jars, and similar electrical apparatus. Area for area, it does not cost much more, is much lighter, and permanently retains its polish. A book of fifty leaves of aluminum, of the ordinary thickness, costs twenty-five cents; of a thickness suitable for Leyden jars, fifty leaves, about four inches square, costs one dollar.

TO RENDER WOOD NON-INFLAMMABLE.—A recent test of a new method of rendering wood non-inflammable, was made in New York city. The preparation is a chemical one, the ingredients not being made public. Georgia pine charged with it and subjected for thirty minutes to a heat of 2,000 degrees, was only slightly charred. One of the inventors claims the chemical will protect the wood a number of years.

A NEW GROCER'S SCOOP.—The Boston Lamina Wood Co., Boston, Mass., are making tea and grocer's scoops upon a new and interesting plan. They are made of three-ply wood, the middle stratum or layer being placed with the grain of wood running at right angles to that of the two outer layers. They are finished with two heavy coats of orange shellac. These scoops will not curl up, like tin, when striking a nail, and they are free from rust.

BATH, Maine, is said to be the greatest wooden shipbuilding place in the world.

GOOD HEALTH.

Is Fat an Indication of Disease?

It has been held by some that "fat in animals is nothing but decomposed and diseased flesh"—"nothing but a mass of scrofula." Some people have ever refused to fatten their horses, "because fat is a disease." Now, fat is simply an oily, concrete material, secreted in various portions of the body. In swine, the abundant secretions about the kidneys are always denominated leaf-lard, or leaf-fat. Similar deposits in horses and neat cattle are called tallow. Nearly every one understands what fat is. A correspondent of the *Phrenological Journal* says:—"The chemical constituents of lard, or fat, consist chiefly of carbon and water. Fat is secreted in different parts of the animal and human body for two purposes, viz, nourishment and combustion. When a hen, goose, or duck enters the period of incubation, she is usually fat; but at the expiration of incubation she will be thin, and sometimes very poor. This fact shows that she has subsisted on her fat during incubation, most of the fat having been consumed to generate animal heat. If that fat had been "disease" or "a mass of scrofula," would it support animal life? Bears, skunks, raccoons, and many other wild animals usually become very fat during warm weather; and thus go into winter quarters, where they subsist entirely on their fat. When the spring returns they crawl from their refuges, lank and emaciated, as their fat, which has been their chief source of nutrition and warmth, is nearly all used up. If diseased tissue were to be absorbed and enter into the circulation (without the presence of any natural food in the stomach and bowels) would it sustain healthful existence; and would such diseased material maintain the natural heat of the body?"

Gangrene is a disease. Putrid flesh is a disease. Such substances will not sustain healthful life. If suffered to remain in the system they will impart their deleterious influences to the early extinguishment of life. Not so with fat. That substance is a sustainer of life as is shown by the above quotation. True, these may be an excessive accumulation of fat, so far as to obstruct locomotion, or seriously or even fatally interfere with the functions of life, as about the heart, liver or kidneys; but fat of itself is neither a disease nor the indication of a disease.

TREATMENT OF SCIATICA.—This troublesome disorder may be often cured and greatly relieved by a resort to the Turkish bath; but as that is often out of the reach of the patient, a good substitute may be found in very hot compresses. Wring out at night, before going to bed, a large towel wet in water as hot as can be endured, and ferment the parts over the affected nerve for half an hour. After the fermentation rub the parts vigorously with the hands, and cover with thick flannel for the night. Persevere with this treatment for several days, and the patient will generally be richly rewarded in a greater or less release from the trouble.

Clogging of the Blood.

People often speak of the blood as becoming clogged, and the expression is a very expressive one, but few have ever seen the process with their own eyes. And yet it may easily be observed by almost any one who has a microscope. To do so, catch a small tadpole, or pollywog, or, better, several, and keep them on hand in a glass vessel of water in which some plants are growing, so they may be handy when you have a little leisure to devote to their study. When you wish to place one under a microscope, take a glass tube of proper size, open at each end, and gently introduce it into the water directly over the young animal, taking the precaution to hold the thumb on the upper end, to prevent the entrance of the fluid into it. As soon as the tube is in the right position, remove the thumb, so the water may enter, which it will do with a rush, carrying the tadpole within. Now, replace your thumb and bring the tube to your eye box, in which the little fellow is placed, with sufficient water to keep him alive. Put on the cover and press it down, so as to hold the animal gently in position, otherwise he will wriggle about too much, and put the slide under your microscope. You will, with a low power of 100 diameters, or even less, see the circulation of the blood in the capillaries. It is a beautiful and instructive sight. These little tubes, when magnified a hundred times, look no larger than a fine cambric needle. They are filled with a transparent fluid—the serum of the blood—in which are millions of red and white blood corpuscles, the former, of course, greatly in excess of the latter. These look like so many discs and balls coursing after each other leisurely. The red ones, in Indian file, follow the center of the stream, while the white ones go nearer the wall of the vessel, and more leisurely. A very little pressure applied to the cover often stops, in one or more of the capillaries, the flow of blood, and then you may see, on a small scale, how the red and white globules stop flowing on as before and begin to dam up the vessel, and by and by all the other vessels get filled up, and the flow of blood is mostly at an end. Remove the pressure, keeping your eye on the plate, and instantly there is a rush of blood, just as there is in a stream when a dam gives way, and in an instant the congestion or clogging is at an end.

What happens in this little animal in this case on a small scale, is just what happens in a human being on a larger scale if pressure is applied to any part; as, for instance, in the feet, when the shoes are tight, in the skin about the forehead when the hat presses close to it, about the waist when the dress is close fitting, and so on. We will not go so far as to say that every one should own a microscope, for, without a teacher, only a few can use it to great advantage; but, with a few lessons in the beginning, one may get a great deal of pleasure and information from it. —*Herald of Health.*

VALUE OF SUNSHINE.—There is a vital relation between sunshine and the human body. Living in the shade is a prolific source of disease among women. A potato grown in a cellar is pale, sickly and worthless; expose it to the sunlight and it begins to show color, strength and power. Rear your daughter in the parlor, and she is pale and sickly; expose her to the sun, and its health-giving, direct rays soon commence to influence her health; keep increasing the daily amount, and from the invigorating sunshine she soon gathers health, strength and beauty. From experiments made with difficult diseases, I find the truest science of success lies in the use made of sunshine. Would poor, suffering women be galvanized into health, let them expose themselves daily for hours at a time to these life-giving rays (if possible without clothing,) always protecting the head by a shade, while the remainder of the body is drinking in vitality, and, other things being equal, health is sure to bless the effort. —*Dr. Larkin.*

SIMPLE CURE FOR COLD FEET.—The following remedy for cold feet is recommended by the *Fireman's Journal*, for sedentary sufferers, as well as policemen, car drivers, and others who are exposed to the cold: All that is necessary is to stand erect and very gradually to lift one's self up upon the tips of the toes, so as to put all the tendons of the foot at full strain. This is not to hop or jump up and down, but simply to rise—the slower the better—upon tiptoe, and to remain standing on the point of the toes as long as possible, then gradually coming to the natural position. Repeat this several times, and by the amount of work the tips of the toes are made to do in sustaining the body's weight, a sufficient and lively circulation is set up. A heavy pair of woolen stockings drawn over thin cotton ones is also a recommendation for keeping the feet warm, and at the same time preventing their becoming tender and sore.

THE ANNOYING HOUSE FLY.—In addition to the other annoyances connected with the presence of the common house fly, Dr. Thomas Taylor, of Washington, D. C., has made some investigations, from which it would appear that that insect is possessed of the capacity for transmitting disease by carrying the germs from place to place. This fact has long been suspected, but we know of no careful experiments having been made to establish the facts in the case.

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SAN FRANCISCO:

Saturday Morning, Apr. 14. 1883.

TABLE OF CONTENTS.

EDITORIALS.—Timbering in Mines—No. 7; Gold
Discoveries near Phoenix, Arizona, 249. Passing
Events; Swelling and Bottom-Breaking Ground; Sediment
in Mining Streams; New Mine Surveying Instru-
ment; The Late Peter Cooper, 257. English Invest-
ments in the Pacific Coast Mines—No. 1; The Payne
Portable Engine, 257. Patents and Inventions; Notices
of Recent Patents, 260.ILLUSTRATIONS.—Methods of Timbering and
Walling in Galleries, 249. The Orange Katydid and
its Poe, 254. Payne's Automatic Cut-off Portable
Straw-Burning Engine, 257.CORRESPONDENCE.—Notes from Eureka, Ne-
vada; Como District, Nevada, 250.MECHANICAL PROGRESS.—Masonry—Ancient
and Modern; Progress of the Steam Boiler; Solid and
Hollow Iron Columns, 251.SCIENTIFIC PROGRESS.—Long Distance Tele-
phoning; Hearing in Insects; The Use of Gas for Heat-
ing and Power; Primeval Celtic Map Stones; Rarefied
Air as a Conductor of Electricity; Sudden Destruction of
Marine Animals; Electrical Light of Comets; Common
Geological Terms and Colors; A Comet Reappears, 251.MINING STOCK MARKET.—Sales at the San
Francisco Stock Board; Notices of Meetings, Assess-
ments, Dividends and Bullion Shipments, 252.MINING SUMMARY.—From the various counties of
California, Nevada, Arizona, Montana, New Mexico
and Utah, 252-53.USEFUL INFORMATION.—How to Test Ma-
chine Oils; Be Careful; What is Soap; A Bullet-Proof
Cuirass; To Render Wood Non-Inflammable; A New
Crozier's Scoop, 255.GOOD HEALTH.—Is Fat an Indication of Disease;
Treatment of Scatica; Clogging of the Blood; Value of
Sunshine; Simple Cure for Cold Feet; The Annoying
House Fly, 255.MISCELLANEOUS.—Spring Valley Mines; The
Lake Valley Mines, 250. Prospecting for Gold and
Silver; Is Cottonwood Timber? The Orange Katydid,
254. Homer, Jordan, Tigua and Prescott Districts, 255.

NEWS IN BRIEF.—On page 260 and other pages.

BUSINESS ANNOUNCEMENTS.

Hydraulic Giant—Joshua Hendy Machine Works, S. F.
Belting and Lacing—H. Royer, S. F.
Elevator Buckets—T. F. Rowland, Brooklyn, N. Y.
Dividend Notice—Silver King Mining Co., S. F.
Dividend Notice—Northern Belle Mining Co., S. F.
Mines Wanted—Mars & Lawler, S. F.
Atlas Engine Works, Indianapolis, Ind.

Passing Events.

There is very little new to report from the mining regions aside from what we have noted in our "Mining Summary." Work is going on nearly everywhere with renewed vigor as the days lengthen. Relocating has placed many prospects into more industrious hands this season, many of which we expect to hear from satisfactorily before long. Up in Idaho, prospecting and mining operations are beginning at least six weeks earlier than they did last season. Already many prospectors have struck into the bills, and many mining operators have returned. Important sales and transactions have taken place during the winter. The same is the case in other localities. The Indian troubles in Arizona are keeping that region back some by deterring the prospector, but the energetic people there will not allow such a state of affairs to last long if the military authorities do not succeed in quelling the disturbances.

The old Spaniards of 300 years ago took out vast amounts of the precious metals near Santa Fe N. M. Among the curious things to be found are the old Mexican ladders still to be seen in some of the mines, and the remains of the old arastras and furnaces made by those ancient miners.

The Castilian Mountain, near Cerrillos, New Mexico, has been worked for hundreds of years and produced some of the finest turquoises found in the world, except Persia.

Swelling and Bottom-Breaking Ground.

Most miners have on occasions had trouble with swelling or bottom-breaking ground. In some camps there is more trouble from this than in others, of course according to the nature of the formation. When it occurs, however, it requires very skillful and careful timbering to prevent accident. The cause of bottom-breaking ground is given by Mr. Henry S. Drinker, in his elaborate work on "Tunneling," when occurring downward, as being in the majority of cases due to hidden caves or sink-holes as in limestone formation. Breaks at bottom occurring upward, he says are the cases where the ground is so heavy, that though the sides and roof may be firmly held, the material is so running as to be semi-liquid, and therefore transmits the side pressure around, and so forces up the tunnel or drift bottom where it is not properly secured by an invert.

In one of the tunnels of the Cincinnati Southern R. R., the curious fact was noted by the resident engineer, that it would not only fall from the roof, but would not stay down in the bottom. The bottom was a hard tough sandstone in layers of four to eight inches thick. These layers would, with a rumbling sound, spring up and break into pieces with a report like a small blast. This would happen sometimes after no work had been done in the tunnel for several days, so that it could not be attributed to the effects of powder. One or two layers would generally come up, breaking off at the wall and then the springing cease. These ledges came up with such force, that men sitting on them, would be thrown over. In one instance a sill, on which posts for timbering were set, was put in on the bottom; the sill extended seven and a half feet beyond the last post, which was lagged and packed overhead, so that at the post, the sill was immovable. One of these ledges springing up, forced this sill—a piece of 8x12 with white oak—up out of its position six inches in seven and a half feet.

Similar phenomena have been observed in the granites at Munson, Mass., and in the lower carboniferous sandstone of Ohio. It is probable that the cause of the break is owing to a state of tension existing in the rock or place; then, when the strata are cut, a tendency to wrong results.

In cutting the Suto tunnel much trouble was occasionally experienced from bottom breaks, more, however, from swelling ground. This was usually met in the roof by extra timbering, while the bottom was simply allowed to rise until it reached a certain point where it is cut down again repeatedly.

At a point 17,890 feet from the tunnel mouth they entered a belt of swelling ground composed of porphyry and clay, which was very difficult to penetrate. The rock swelled to such a degree that timbers 14x18 inches thick would be broken three hours after they were placed, and, although a gang of men were kept at work easing up behind the timbers, they were continually breaking, and it was exceedingly difficult to make any progress. Not only did the timbers break but at times the posts would press through the caps. For a long time they could suggest no means to withstand the pressure, but finally a new plan of timbering was devised which proved successful.

They first placed the ordinary 12x16 inch square set of timbers, and then made an excavation above the cap, in which they placed two angle braces meeting at an apex. By this means the great pressure from above was prevented from coming directly on the caps, it being taken up by these angle braces, upon which it was exercised first. They were thus pressed gradually into the sides of the tunnel until the apex at which they met was finally forced down close to the caps. When that time arrived they were dug out and placed again. In this manner the main timbers were saved, and since they placed two-inch lagging on top of these braces and three-inch lagging on top of the main caps, the men were protected from falling rocks, and the work could progress without delay. The lagging above the upper set was purposely lighter than that over the main lower set, so as to allow it to break and give the ground a chance to swell behind. Extra posts were placed in order to protect the main posts, but no sills were used in such ground, for they would be constantly breaking. They simply allowed the ground in the bottom to swell up until say eighteen inches above the proper

level, when it was cut down and the railroad track re-laid. After passing through the swelling ground at the point referred to they had to cut it down seven times, that is to say, the bottom of the tunnel at this point was cut down seven times eighteen inches, or ten and a half feet. The most of the swelling ground extended for about 300 feet; the total distance of had ground extended over 100 feet.

Sediment in Mining Streams.

In the last number of the MINING AND SCIENTIFIC PRESS was given a method of determining the amount of sediment held in suspension in streams. The subject is quite an important one here in California, where mining is done near the streams. Yet it is little understood by people who ought to know, as was very fully shown by the conflicting statements made concerning it in the recently-tried case of Woodruff vs. the North Bloomfield Mining Co.

One engineer swore that there were 45,000 cubic yards of solid matter moving down the Yuba past Marysville. He estimated that three and a half per cent. is carried in suspension by the Yuba past Marysville. The same man swore that three times as much "crawls" along the bottom of the river. Figuring from this data, there results 580,000,000 cubic yards of sediment passing Marysville per annum. The total hydraulic mining excavations on the Yuba watershed are, according to the same engineer, 176,000,000 cubic yards; hence, if his data had been correct, more than three times as much sediment is discharged into the Feather river from the Yuba each year than has been excavated from all the mines on the Yuba river watershed since the year 1849. Another man (on the same side of the case) took a sample at the same time, and found it to contain by weight 1.23 per cent. of sediment. This, reduced to volume, gives .64 of one per cent. of sediment, or about one sixth of the percentage fixed by the other engineer's experiment.

Two other engineers took samples of the Yuba river water opposite Marysville in October last, in the most careful manner; and as a result determined the amount of sediment in suspension at the same point where the other experiments were made, to be 19-100 and 12.100 of one per cent., as fixed by two separate samples.

With all the data at the command of the State Engineer, he was unable to show how much of the material mined in the past had gone down into the valley, and how much had remained in the mountain streams. What percentage of the material removed from the hydraulic mines comes down into the valley, it is impossible for any one to state with exactness, there not being sufficient data at hand to enable any engineer, no matter how competent, to make an exact estimate. Such data could be only obtained by elaborate surveys requiring several months' time. In making an estimate of the debris remaining in the Main Yuba, South Yuba, and Middle Yuba, the State Engineer concludes there are 29,870,000 cubic yards, while another engineer estimating on the same river makes the amount 21,507,000 cubic yards. Thus, in less than 30,000,000, there is a difference of over 8,000,000, or about 40% in the estimate. And when it comes to calculating on debris in suspension, the differences in estimate are even greater.

A RUSH FOR COPPER ORES.—Santa Fe district, Esmeralda county, is fast opening a very large area of copper mining. There are a great many prospects in that section of the country, nearly all of which are being worked more systematically and energetically this season than at any previous time. Some very pretty specimens were brought in this week, and very flattering accounts are told of quite a number of fine looking properties. Several smelters will necessarily have to be erected at an early date, each of which will cause more search to be made for copper ore, and assist the settlement of this fast becoming noted mining section of Nevada.—*Candelaria True Fissure.*

BELOW the Gold Valley Tunnel and Mining Co.'s ground, which is two and a half miles from Scales Diggings, Sierra Co., there are two debris dams, one mile apart, built by the mining companies of the northern part of Sierra county and southern portion of Plumas county. These companies have consolidated and bought the tailings claims in Slate creek, paying therefor \$15,000. The dams are eighteen feet high on the lower sides, and can be raised to 100 feet in height if necessary. They are capable of holding the debris from a great many mines for years to come. This is one practical way of settling the debris question.

New Mine Surveying Instrument.

Most mining engineers have experienced the unsatisfactory nature of the ordinary transit, when applied to certain work about mines, and have had difficulty in placing it in proper position for vertical sights. Mr. Robinson Gibbons, of this city, has just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency an attachment for transits and other surveying instruments, which renders it possible to direct the telescope to a point beneath the instrument.

Mr. Gibbons uses the ordinary plate which usually supports the telescope of a transit or other surveying instrument, having the needle-box, graduated divisions, verniers and other attachments usual to such instruments, and a means for mounting it upon a tripod or other support. He has devised, however, a supplemental plate, formed preferably in the arc of a circle, so as to coincide with the main plate upon which it is supported. This supplemental plate is hinged to the other one at one side, and when let down upon it is parallel or level with it. The standards upon which the telescope is mounted are secured to the supplemental plate so as to partake of its motion.

As before stated, the supplemental plate is hinged at one side to the main one. At the opposite side of the main one is a vertical arc passing through a slot in the hinged supplemental one, and a clamp is arranged to hold the swinging plate at any desired position on the arc. This arc is jointed at the bottom, so that when the supplemental plate is horizontal in the main plate, the arc may be folded down out of the way for the ordinary operations of the instrument.

Wherever it is desired to use the telescope at an angle more nearly vertical than can be attained upon the main plate, or support as ordinarily constructed, the supplemental plate is lifted about its hinge and the clamp screw fixed so as to hold the supplemental plate rigidly to the arc, when the telescope may be made to assume a vertical position to one side of the main plate, so one may look down vertically.

The device is especially useful in laying out the direction of an underground drift in a mine upon the surface. In such a case, the instrument may be set above a shaft, and the telescope turned down, so that two points may be determined upon a line which leads across the shaft and into the drift. This avoids the danger of mistake on account of an aberration of the compass, which often occurs below ground, and the direction being once fixed, the remainder may be made to correspond upon the surface and below. When not in use, the supplemental part may be folded down out of the way. The device is quite effective.

The Late Peter Cooper.

The Mechanics' Institute, at a special meeting Saturday night, adopted the following upon the death of the venerable philanthropist, Peter Cooper:

WHEREAS, Intelligence has reached this Society of the death of the venerable Peter Cooper, whose works of beneficence toward the working classes are well known, and who in founding, maintaining, and guarding, for twenty-four years, the Cooper Institute, in addition to other works of beneficence and philanthropy, evinced a consciousness and scrupulous regard for the well-being and future prosperity of many thousands of young citizens and mechanics, as well as an appreciation of the condition of the working classes; it is

Resolved, By the Mechanics' Institute, in meeting specially called to recognize the fact of the death of our friend and benefactor, Peter Cooper, that we recognize in his life an example of what a noble and good man can do for the benefit of his fellow-men during his lifetime; that we recognize in the death of Peter Cooper the inevitable fact that death must come to us all, but that the death of such a man is an irreparable loss to the people at large, and more especially to the mechanic and workman of America. We further recognize the fact that the beneficent acts of Peter Cooper during his life are more emphatic in their own praise than any words of ours could be, and more enduring than any monument we could erect. We, therefore, simply thank God that such a man lived, and desire to express our humble submission to the fact of his death and our loss.

Resolved, That the above preamble and resolutions be spread upon the records of this Society.

The resolution was ordered to be spread upon the minutes of the Institute, and a copy was ordered engrossed and sent to the family of the deceased. Several gentlemen made short and eulogistic addresses, and the meeting adjourned.

THE General Custer mine, at Custer City, Idaho, in the Yankee Fork district, has been running a twenty-stamp mill since January 1, 1881, and since that time has produced an average of about \$70,000 per month in gold and silver bullion.

English Investments in the Pacific Coast Mines—No. 1.

[Prepared for the MINING AND SCIENTIFIC PRESS by H. DEERROOT.]

Total Expenditure and Results.

It is now about twenty years since English capital began to be invested in the mines on the Pacific coast. Commencing with the gold mines of California, these ventures were gradually extended to the silver mines of Utah and Nevada, some limited investments having meantime been made, also, in Oregon, the foregoing being the only countries of which any note will be taken at this writing. While the sum total that has been so invested can be only approximately arrived at, it is known to have been large, reaching not less than \$30,000,000. By this we mean money actually expended in the purchase of mining properties, and in equipping and improving the same, the money that may have been lost through speculations in this class of mining shares on the English market not being included in the above estimate. And here it may be observed that the capital stock of these English companies consists of actually paid up shares, it not being the practice there to organize companies with an absurdly large, but mere nominal capital, as, to our discredit, is done in this country.

Of the money actually expended by these English investors, about three fifths—say eighteen million dollars, have already proved a total loss, one fifth having turned out tolerably good and the remaining one fifth a first-class investment; in the category of the tolerably good, there being included a number of properties, which, while they have not as yet yielded any profit, promise to do so, some of them in the early future. Why so large a proportion of these ventures have proved failures will be noted as each particular case comes to be considered, some remarks bearing on the same point, but general in their application, being added after our review of the history of these enterprises has been completed.

The first enterprise on this coast undertaken by English capital was the construction of the Truckee canal, built to take water from the Sierra Nevada and convey it upon the divide between the North and the Middle Forks of the Yuba, in Sierra county, California. This canal was completed in 1858, at a cost of \$1,000,000, nearly the whole of which was lost to the original investors. A more ill-advised work was never constructed nor even projected, the canal, which had a large carrying capacity, ending in a neighborhood noted for its limited water requirements. On this divide there were scarcely any hydraulic deposits—only drift diggings, and these at the time pretty well exhausted. There being here no demand for this large supply of water, and it being well nigh impossible to conduct it to points where it could be sold or profitably employed, the company were forced to abandon their ditch, which being neglected, soon after became a total ruin. The sum of \$50,000 realized from the sale of their water franchise was all that these first adventurers in the mines of California saved out of their heavy investment.

More Fortunate Ventures.

In the summer of 1869 an English syndicate bought and came into possession of the Sierra Buttes quartz mine, situate thirteen miles east of Downieville, Sierra county, paying for the same, according to report, the sum of \$1,000,000. The purchase was capitalized at \$1,225,000, the stock consisting of 122,500 shares of the par value of \$10 each. This property has paid dividends, with the exception of six months or one year at the most, from the time it was bought to the present. After the custom in England, this company has adopted the plan of declaring their dividends semi-annually. The sum total disbursed to the shareholders amounted in October last, to \$1,429,683. For several years at first, while the ore remained of a tolerably good grade, the mine made net earnings at the rate of twenty per cent. per annum on the amount paid for it; latterly the ore has so deteriorated that such earnings have not exceeded five or six per cent., having amounted to only fifty cents per share. For a number of

years past the net proceeds of the mine have varied from fifty-five to seventy-five thousand dollars per annum. Just now it is hardly clearing the smaller of these sums, as much money requires to be expended in searching after and opening up new bodies of ore.

The Sierra Butte shares are now quoted on the London market at \$7.50 each, a figure at which it is thought they can be maintained, the prospect for an early improvement in the quality of the ore being considered good. Besides a steady impoverishment of their ores, which yield now hardly more than \$5.50 per ton, this company have met with some other setbacks of late. One year ago their principal mill was totally destroyed by a snow slide. This accident, besides necessitating the building of a new mill, to be put up the coming summer, has since seriously curtailed the productive capacity of the mine. For several years past an immense amount of dead work has been in progress here, and some of which will require to be kept up for a year or two more. A part of this work consists of a long tunnel carried in on a lower level than any heretofore driven. All the ore thus far has been taken out through tunnels, no hoisting works having until recently been erected here, those now in use being employed to lift the ore after it has been brought out through the tunnels up to the mills, the latter being now considerably above the level of the lowest tunnel run. The mills heretofore built have been placed high up against the side of the mountain. The new mill about to be put up will be located down on the river, and at a point so low that the ore hereafter taken from the mine will be carried to it by the force of gravity. There are now 50 stamps running on the ore from this mine besides some 35 or arastras, the whole being driven by water. These arastras, which are employed in working over the tailings are owned by outside parties, who pay the company a percentage of the gold taken out. The new mill, also to be propelled by water, will be built with a view to subsequent enlargement, there being always water enough in the North Yuba river, on which it is to be located, to drive almost any required number of stamps. The cost of extracting and milling the ore here amounts to not quite four dollars per ton, a good deal of this being due to the large amount of dead work that for some time past has been in progress. This company employs an average of 220 men, about three fourths of them in the mine.

This property comprises a number of quartz lodes varying from 30 to 50 feet in width and carrying large ore chutes distributed irregularly through the vein matter. The Sierra Buttes was among the first quartz mines ever worked in the State, operations having been commenced upon it with arastras as early as 1852, from which time up till 1857 it turned out about \$250,000. From 1857 to 1860, inclusive, the gross production made here amounted to \$1,835,525, of which \$1,139,000 were disbursed in dividends. All the expenses incurred in working and improving the mine, plant included, were met from the net proceeds.

In 1872 this same syndicate bought another and similar property, known as the Plumas Eureka, and for which they paid about the same sum as for the Sierra Buttes mine. This second property, which is located in Mohawk valley, Plumas county, had up to the time of its purchase produced nearly \$2,000,000, over a fourth of which had consisted of net profits.

The new company organized with a capital stock of \$1,406,250, divided into 140,625 shares, of the par value of \$10 each. From the year of their organization up to 1881, with some slight intermissions, they paid an annual dividend of \$1.50 per share, which dividend for the past two years has been reduced to \$1 per share—one half the above rates of dividends having been disbursed semi-annually. The sum total of dividends paid to date amounts to one and a half million dollars. The present rate of net earnings can, it is believed, be kept up here for an indefinite period, certainly for a number of years to come.

This is beyond any question a valuable property, the mineral deposits consisting of three powerful lodes, each containing large masses of ore of moderately good grade; that worked of late years having yielded an average of about \$7 per ton. Cost of extraction and working, \$3.25 per ton; the quantity raised ranging from forty-five to fifty thousand tons yearly, as at the Sierra Buttes. The ore here is taken out through a series of tunnels, the one below the other, and by means of which the several lodes can be worked and drained to a depth of more than a thousand feet. For ore reduction purposes a sixty stamp, water-driven mill has been provided, an old mill built some years since being no longer in use. The new mill, in every respect a superior structure, occupies an eligible site, being located so far below the mine that the ore will for a great many years be carried to it by the force of gravity. For preparing and grinding the tailings a large number of concentrators and arastras have been placed below the batteries. A great deal of dead work has latterly been done at this mine. As less will be required in the future, the cost of billion production will undergo a corresponding diminution.

A year or two since, the ore chutes in the river tunnel became so broken up that it was deemed advisable to drive a tunnel on a still lower level, in the hope that it would develop

The Payne Portable Engine.

The engraving given herewith represents the Payne automatic cut-off portable engine, arranged for straw-burning and field work. This engine is not complicated, and every part is easily accessible. The material is so distributed as to give a perfectly balanced engine. The heat passes twice through the boiler, and is utilized in heating the water instead of passing up the stack. The manufacturers claim that this is the safest boiler in the market. The return flue and spark-arresting chambers give almost entire safety from sparks, and absolute safety when the engine is not crowded and made to develop more power than it is rated at. The construction is of the best. The wearing parts are easily renewed or taken up. The boiler, which needs more care than any other part, but which generally receives the least, is easily gotten at. By raising the doors at both ends, the flues are completely exposed, and easily cleaned or repaired.

The governor is Tabor's patent automatic cut-off, the eccentric rod of which is attached directly to the valve stem, so that whatever change is effected in the eccentric is transmitted at once to the valve. One feature of this governor is particularly valuable. In case of breakage, the eccentric is immediately carried to a position of minimum throw, and the engine stopped at once. Should the drive belt break, or be thrown off the pulley, a corresponding action takes place. Any change in resistance applied to the wheel is accompanied by a corresponding change in expansion. There is no throttling or wire drawing of steam, such as is experienced by the ordinary governor. The advantages of using steam expansively are many. To receive the full advantage of expansion, however, the steam should be admitted to the cylinder at boiler pressure and cut off sharply at such a point as will enable it to overcome the resistance applied and maintain the required speed. This can only be done with the automatic cut-off, where the governor is applied directly to the cut off valve. To effect this result the device known as Tabor's automatic cut-off is employed.

Messrs. H. P. Gregory & Co., of 2 and 4 California street, in this city, who are sole agents for this coast,

inform us that the new engine will work, under favorable circumstances and with attention, at the rate of three and eight tenths pounds of combustible per transmitted horse power per hour. It is expected that the engine will keep up to this standard in ordinary use with the usual ease but properly fired they may be worked with about three and a half pounds of good coal per horse power per hour, equal to the usual rate of first-class stationary engines.

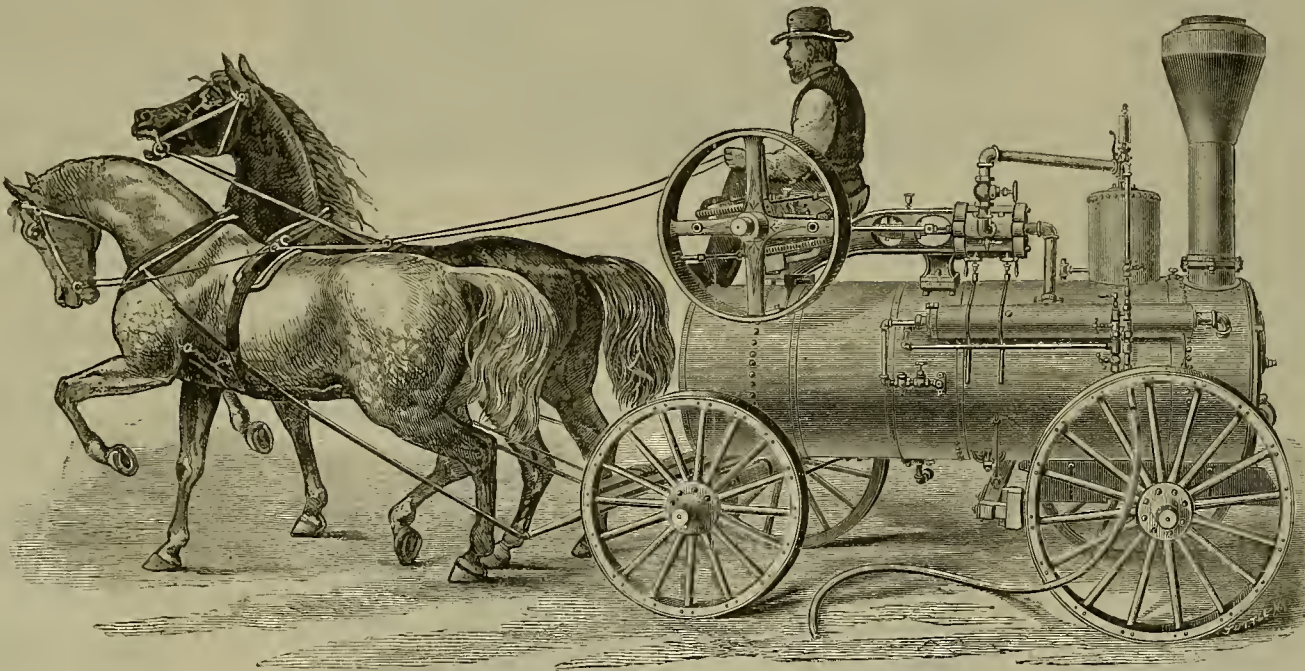
The circular states that a series of careful tests, extending over several days, gave the following results from a ten horse power engine. The transmitted power was determined with the friction brake, constantly lubricated with water. Indicator diagrams were taken every 15 minutes, as were, also, the tension on the brake, number of revolutions per minute, and the steam pressure.

Engine—Seven-inch bore, 8-inch stroke. Boiler—Return tubular, 32 inches diameter, nine feet long, 17 three-inch flues seven feet long; fire fine eighteen inches diameter, seven feet long.

Average number of revolutions per minute..... 279.9
Average boiler pressure, lbs..... 80.5
Average tension on brake, lbs..... 149.58
Average transmitted horse power..... 13.499
Average coal consumed per transmitted horse power per hour, lbs..... 4.22
Combustible per transmitted horse power, lbs..... 3.8
Water evaporated per lb. of coal, lbs..... 9.25
Water consumption per transmitted horse power per hour, lbs..... 29.
Average indicated horse power..... 15.98
Average coal per inch horse power per hour..... 3.57
Average combustible per hour..... 3.22
Actual water consumption per inch horse power per hour..... 33.
Average m. e. p..... 36.84

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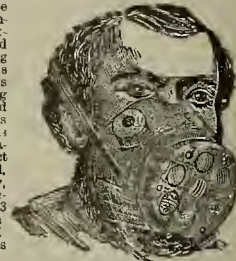
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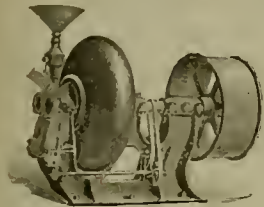
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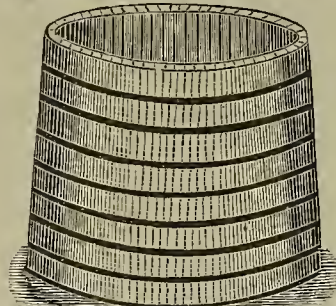
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FOR THE WEEK ENDING APRIL 3, 1883.

- 275,324.—CAR AXLE—Geo. W. Bedbury, Portland, Oregon.
 295,030.—SULKY HARROW—John Feess, Marysville, Cal.
 295,034.—ATTACHMENT FOR TRANSITS, ETC.—R. Gibbons, Alameda, Cal.
 275,036.—SELF-REGULATING WINDMILL—Geo. K. Glenn, Woodland, Cal.
 275,049.—WASHING MACHINE—E. J. C. Kals, Yolo, Cal.
 275,057.—MINERS' CANDLESTICK—J. C. Martin, Tuscarora, Nev.
 275,075.—DIRT SCRAPER—Jas Porteous, Fresno, Cal.
 275,085.—MAGAZINE GUN—Simmons & Adams, S. F.
 275,093.—CODLIN MOTH TRAP—Geo. W. Thisell, Winters, Cal.
 274,999.—ELECTRIC ARC LAMP—F. G. Waterhouse, Sacramento, Cal.
 275,102.—MACHINE FOR REBORING CYLINDERS—Wm. E. Wild, Candelaria, Nev.
 275,103.—BORING, DRILLING AND FACING MACHINE—Wm. E. Wild, Candelaria, Nev.
 275,104.—GRAIN CLEANER, SEPARATOR AND GRADER—Wm. E. Wild, Candelaria, Nev.
 275,105.—GRAIN CLEANER, SEPARATOR AND GRADER—Wm. E. Wild, Candelaria, Nev.
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Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

BRACE FOR AXLE SPINDLES.—Robt. R. Spedden, Astoria, Oregon. No. 274,230. Dated March 20, 1883. This brace for axle spindles consists in the details of construction of a rod or bar attached by one end to the axle and by the other to the end of the spindle, its intermediate portion passing around or over the rim of the wheel. The object is to strengthen the spindle without increasing the friction, whereby a smaller spindle may be used, which will have as much strength as, and less friction, than a larger one without a brace.

MAGAZINE GUNS.—John P. Simmons, S. F., and Samuel Adams, Antioch, No. 275,085. Dated April 3, 1883. This invention relates to certain improvements in breech-loading small arms of that class known as "magazine guns," and it consists in an improved construction of the breech mechanism, so that the cartridge is taken from the magazine, and carried up and inserted into the barrel, the follower is locked when in place, and the gun is cocked, all by a novel mechanism. The movement of all the principal working parts are direct and positive, and no springs are employed to assist in any of the movements.

DIRT SCRAPER.—James Porteous, Fresno, No. 275,075. Dated April 3, 1883. These improvements in dirt scrapers consist in a means for limiting the throw or dump of the bowl, whereby the tail lever or handle is prevented from striking, or getting in the way of the horses, and in a means for raising the edge or bit of the bowl when in this limited dumped position, in order that it may not drag along the ground.

SELF-REGULATING WINDMILL.—Geo. K. Glenn, Woodland, Yolo county, assignor of one half to Hall & Bidwell, same place. No. 275,036. Dated April 3, 1883. The arms are made self-regulating, so they may adjust themselves to the intensity of the wind. The object is to provide a simple, self-regulating windmill, and the object is attained by adopting an old and simple form of mill, and by means of simple changes and devices, convert it from its old and objectionable shape to an effective self-regulating mill.

DYSPEPSIA, the bug-bear of epicureans, will be relieved by Brown's Iron Bitters.

THE Chicago and Northwestern Railroad has issued a statement showing it has in operation and under construction a total of 5,000 miles of road.

Complimentary Sample Copies of this paper are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage; and as far as practicable aid in circulating the journal and making its value more widely known to others and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year.

N. B.—Personal attention will be called to this (as well as other notices, at times) by turning down a leaf.

Pacific Business College.

The Pacific Business College, beautifully located at 350 Post street, S. F., opposite Union Square, is enjoying merited prosperity. A host of young men from all parts of the coast are to be found here, rapidly preparing themselves for entrance to business life. The institute is worthy the attention of those seeking an acquaintance with business methods of the most approved order. The courses of study have been specially prepared to meet the requirements of a business life, and are thorough and practical. In the commercial course, a system of actual business is employed, combining theory and practice, and is at once so simple and natural that it needs only an explanation of its merits to convince the most skeptical of its superiority over all other systems. Book-keeping in all its departments, and the collateral branches included in the business course, are taught in the most thorough and systematic manner. The academic course is designed to give regular and systematic trainings in the English and advanced mathematical branches, and to prepare those who need elementary education to enter upon the commercial course with a better foundation, and with more certainty of success. In the business course, the class system is entirely discarded, except for general reviews and practical exercises on the blackboard. Students receive such individual instruction in the several departments as to enable them to pursue their studies as rapidly as their ability will admit. No student, therefore, is kept back in his course by those of less ability and application. On the contrary, he is always advanced as rapidly as is compatible with thoroughness. Those who have not had the advantages of education in youth will here find the readiest means of supplying their deficiencies. Ladies are admitted into all the departments of the college on an equal footing with young men. They receive the same instruction, and have in every respect the same advantages as the other sex. The Pacific Business College is recognized as one of the substantial institutions of California, and affords excellent facilities for acquiring a thorough business education. The proprietors, Profs. Chamberlain and Robinson, are practical men and first-class educators in the line they have chosen to work.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANES, State Mineralogist.]

[CATALOGUE.]

4804. White Sand—Thirty-two feet from the surface, near Lincoln, Placer county, Cal. In its natural state. (See No. 379.) John Landis.
 4805. White Sand—Thirty-two feet below the surface, near Lincoln, Placer county, Cal. The same as No. 4804, but washed. John Landis.
 4806. White Sand—Found 32 feet below the surface in the Clippert coal mines, near Lincoln, Placer county, California (see No. 4804). John Landis.
 4807. White Sand, Washed—Found 32 feet below the surface in the Clippert coal mines, near Lincoln, Placer county, California (see No. 4804). John Landis.
 4808. Clay—Found below the coal beds, 75 feet below the surface, Clippert coal mines, near Lincoln, Placer county, California. John Landis.
 4809. Washed Clay—Found on the sand stratum, 30 feet below the surface, Clippert coal mines, near Lincoln, Placer county, California. John Landis.
 4810. Ironite—Clippert coal mines, near Lincoln, Placer county, California (see No. 382). John Landis.
 4811. Lignite—Clippert coal mines, near Lincoln, Placer county, California. This material has not yet received the study it deserves. It very much resembles ironite which has been analyzed, and while it has the appearance of being a very inferior lignite, it serves many useful purposes as a fuel, and is contained in large quantities in the neighborhood. John Landis.
 4812. Water from Owens' great lake, Inyo county, California. S. D. Woodhull.
 4813. Chalcedony—Upon the surface of which are stellar aggregations of the binoxide of manganese (?) (see No. 2107). Aurora, Esmeralda county, Nevada. F. W. Smith.
 4814. Red Brecciated Jasper—Near Aurora, Esmeralda county, Nevada. F. W. Smith.
 4815. Model of a Gold Bar—The result of one run made in the North Bloomfield hydraulic mine, Nevada county, California. Wei, bit, 6,127.5 ounces Troy; gold, fine, 897; silver, fine, 93; total value, \$114,281.72. This is probably the largest gold bar ever cast in the State. Presented by Henry G. Folsom.
 4816. Eulima Subulata (Desh.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4817. Canellaria Umbilicaria (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4818. Venus Scalaris (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4819. Murex Tapparonii (Bele.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4820. Venus Scalaris (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4821. Soleculius Constatatus—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4822. Trochus Patulus (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4823. Arcu Nole (Linn.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4824. Terebratulina Grandis (Blum.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4825. Corbula Gibba (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4826. Phorus Orisopus (Kon.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4827. Solenaster Simplex (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4828. Cymbella Euthrostroma (?)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4829. Trochus Patulus (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4830. Niso Tebellum—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4831. Dillia Brochii—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4832. Venus Rostatus—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4833. Fucosia Fimbriata (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4834. Fucus Clavatus (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4835. Murex Scalaris (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4836. Mitra Striata (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4837. Canellaria Mitriformis (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4838. Cardium Papillosum (Foll.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4839. Murex Polymorphus (Brochii)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4840. Venus Callina (Linn.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4841. Polia Phicata—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
 4842. Fossarus Constatum (Phil.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.

News in Brief.

THE population of Los Angeles is estimated at 20,000.
 THEY have formed a base-ball club in New York, and the players are all Chinamen.
 DIAZ is reported to have said that the so-called German land scheme in Mexico is wholly imaginative.
 THE most disastrous prairie fire that ever occurred in Nebraska was raging, Sunday, a few miles north of Lincoln.
 THE Spanish Chamber of Deputies has passed the bill permitting the substitution of affirmation for an oath, when desired.
 PRESIDENT ARTHUR, Secretary Chandler and Senator Miller, of New York, left Washington last week, for Jacksonville, Fla.
 THE Raymond excursion party, consisting of 150 Bostonians, has left Chicago via Rock Island for San Francisco and the Pacific coast.
 THE Russian police believe that unless liberal reforms are granted the Nihilists have determined to prevent the ceremony of coronation.
 THE farm of ex-Governor Don Pio Pio was sold at Los Angeles, Saturday, for \$60,000. It was purchased by an association and is to be subdivided and sold in small farms.
 A ST. PETERSBURG dispatch says: The local Chief of Police and all others who contributed to the comfort of the crews of the Jeanette and Rodgers have been decorated by the Czar.
 In the British House of Commons Jacob Bright introduced a resolution, which was adopted, against any power exercising dominion or privileges in the Congo country to the exclusion of others.

THE Central Pacific Company propose to demonstrate whether the grape industry can not be made profitable near Reno, by the planting and care of ten acres in vines on the hill near the reservoir.

THE railroad survey up Snake River, I. T., has progressed fifty-one miles. They are now in the hardest part of the canyon. Chief Engineer Clark is with the party coming down. The instructions are to hurry the survey and lay the grade stakes as they proceed.

THE New York Mail and Express says: The immigrant lists for the week closing Saturday have not been so large as the season would warrant or was expected. This is due, it is thought, to the action of European agents in booking steerage passengers through to California and the West, by way of New Orleans, at \$35 a head.

THE Immigration Association reports the arrival of 1,078 immigrants during the past week. Of this number 709 came by the Central Pacific Railroad, and 359 by the Southern route. Eight hundred and thirty eight were males, and 240 females. A number were married men who came out in advance of their families.

AS WILLIAM FENDER was walking down the mountain side at Highland, Lake county, a sudden gust of wind caused him to fall to the ground, and at the same time a half-felled tree fell upon him and caused such injuries that he died within two hours. His wife, when she learned of his death, went stark mad.

MRS. R. E. HEWITT, of Santa Ana, purchased from a traveling peddler a powder, which purported to be a specific against the explosion of coal-oil lamps when placed in the oil. Having no use for the powder, she threw it into the fire in the stove. Instantly a stream of fire shot up into the lady's face, burning her severely, though not dangerously.

SINCE the pest of phylloxera became so general, the adulteration of French wines has been so open and undisguised as to be thought a matter of course by commercial people, yet 18,000 wine merchants of the Department of the Seine held a mass meeting a day or two ago, and addressed themselves to the legislative and municipal authorities, asking that the abuse be corrected.

AN analysis of the contents of the stomach of John Dwyer, found dead in a lodging house in this city, on the 2nd inst., has been made, and William T. Wenzell, presented the following report to the coroner: "I have made a chemical and microscopical examination of the stomach and contents of John Dwyer, which show that his death was probably caused from eating mince pie containing tainted or partially decomposed meat. The chemical analysis demonstrated the presence of a poisonous cadaver alkaloid."

GEN. SHERMAN, when in June he starts upon his last tour as Commander of the Army, will not take ladies with him, as he has done hitherto, for the proposed trip will be altogether too rough a one for the ladies. They will go first to Detroit, thence through northern portions of the Territories, including the outposts in Alaska. Returning, they will visit California and the Yellowstone Park. They will not start until after Gen. Sherman has attended the graduating exercises at West Point.

L. C. MARSHUTZ.

T. G. CANTRELL.

National Iron Works,

Northwest Cor. Main and Howard Sts., San Francisco,
 MANUFACTURERS OF

IMPROVED PORTABLE HOISTING ENGINES

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Stationary and Compound Engines, Flour, Sugar, Quartz and Saw Mills. Arranging and Forging Machines.

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Sole Manufacturers of Kendall's Patent Quartz Mills.

The Secret

of the universal success of Brown's Iron Bitters is simply this: It is the best Iron preparation ever made; is compounded on thoroughly scientific, chemical and medicinal principles, and does just what is claimed for it—no more and no less.

By thorough and rapid assimilation with the blood, it reaches every part of the system, healing, purifying and strengthening. Commencing at the foundation it builds up and restores lost health—in no other way can lasting benefit be obtained.

75 Dearborn Ave., Chicago, Nov. 7.

I have been a great sufferer from a very weak stomach, heartburn, and dyspepsia in its worst form. Nearly everything I ate gave me distress, and I could eat but little. I have tried everything recommended, have taken the prescriptions of a dozen physicians, but got no relief until I took Brown's Iron Bitters. I feel none of the old troubles, and am a new man. I am getting much stronger, and feel first-rate. I am a railroad engineer, and now make my trips regularly. I can not say too much in praise of your wonderful medicine. D. C. MACK.

BROWN'S IRON BITTERS does not contain whiskey or alcohol, and will not blacken the teeth, or cause headache and constipation. It will cure dyspepsia, indigestion, heartburn, sleeplessness, dizziness, nervous debility, weakness, &c.

Use only Brown's Iron Bitters made by Brown Chemical Co., Baltimore. Crossed red lines and trade-mark on wrapper.

Books for Miners and Millmen.

KUSTEL'S CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for gold-bearing sulphurets, arsenurets, and gold and silver ores generally, with 120 lithographic diagrams. 1867. This work is unequalled by any other published embracing the subjects treated. Postpaid, \$7.50. Printed and sold by Dewey & Co., S. F.

KUSTEL'S ROASTING OF GOLD AND SILVER ORES (Second Edition, 1880), and the Extraction of their Respective Metals without Quicksilver. Illustrated. 156 pages. A valuable and carefully written work. Postpaid, \$3. Sold by Dewey & Co., S. F.

AARON'S LEACHING GOLD AND SILVER ORES.—The most complete hand-book on the subject extant, 164 pages octavo. Illustrated by 12 lithographic engravings and four woodcuts. Fully indexed. Plainly written for practical men. In cloth, \$3. Sold by Dewey & Co., S. F.

U. S. MINING LAWS AND COAL LAND LAWS.—Containing instructions and blank forms. Postpaid, 50 cents. Sold by Dewey & Co., S. F.

COPP'S AMERICAN MINING CODE, to replace Copp's Handbook of Mining Laws, now out of print. United States, State and Territorial Mining Laws and Land Office Regulations; Digest of Land Office and Court Decisions; List of Patents issued, and Dr. Raymond's Glossary, with Form for Mechanics' Liens, Location Notices, etc. Price, postpaid, in paper, 50 cents. Sold by Dewey & Co., S. F.

THE EXPLORER'S MINERS' AND METALLURGISTS' COMPANION, by J. S. Phillips, M. E., comprising a practical exposition of the Various Departments of Exploration, Mining, Engineering, Assaying, and Metallurgy, containing 672 Pages and 83 Engravings. Price, bound in cloth, \$10.50. Sold by Dewey & Co., S. F.

MINING, ENGINEERING, MECHANICAL, FARMING, SCIENTIFIC, INDUSTRIAL AND NEW BOOKS in general can be ordered through Dewey & Co., publishers of the MINING AND SCIENTIFIC PRESS, S. F., at publishers' rates.

CORRESPONDENCE is cordially solicited from reliable sources upon all topics of interest and value to our readers.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

NOTICE OF THE APPLICATION

—OF THE—

South Comstock Gold & Silver Mining Co.

For Dissolution and Disincorporation.

Notice is hereby given that the South Comstock Gold and Silver Mining Company has this day filed with the Clerk of the Superior Court, of the City and County of San Francisco, an application for Dissolution and Disincorporation, and all persons desiring to file objections to such application are hereby notified to file such objections within thirty days after the first publication of this Notice.

March 8, 1883. WILLIAM T. SESNON, Clerk.
Date of first publication, } O. Z. SOULE, Deputy Clerk.
March 16, 1883. }
WHITE MORE & McKEE, Attorneys for Petitioners.

DIVIDEND NOTICE.

OFFICE OF THE

Navajo Mining Company.

San Francisco, April 2, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 8, of Twenty-five Cents (25c) per share, was declared, payable on FRIDAY, April 13, 1883. Transfer books closed on Saturday, April 7, 1883, at 12 o'clock M.

J. W. PEW, Secretary.

OFFICE—Room 15, No. 310 Pine street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, April 2, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 53, of Twenty-five Cents (25c) per share, was declared, payable on THURSDAY, April 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WM. WILLIS, Secretary.

OFFICE—Room No. 29 Nevada Block, No. 309 Montgomery street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill & Mining Company.

San Francisco, April 10, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 71, of fifty cents (50c) per share, was declared, payable on MONDAY, April 16, 1883. Transfer books closed on Friday, April 13, 1883, at 3 o'clock P. M.

WM. WILLIS, Secretary.

OFFICE—Room No. 29, Nevada Block, No. 309 Montgomery Street San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company

San Francisco, April 4, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 40) of Twenty-five Cents (25c) per share was declared, payable on MONDAY, April 15, 1883, at the office of the Company, Room 19, No. 323 Montgomery Street, San Francisco, Cal. Transfer Books will close April 7, 1883, at 12 M.

JOSEPH H. NASH, Secretary.

Buchanan Gold Mining and Milling Company.—Location of principal place of business, San Francisco, Cal.; location of works, Tuolumne, Tuolumne county, Cal.

Notice is hereby given that, at a meeting of the Board of Directors, held on the 3th day of March, 1883, an Assessment (No. 2) of Five (5) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in United States gold coin, to the Secretary at the office of the Company, room 3, No. 121 Post street, San Francisco. Any stock upon which this Assessment shall remain unpaid on the 2d day of May, 1883, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on FRIDAY, June 1, 1883, to pay Delinquent Assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

P. J. SULLIVAN, Secretary.

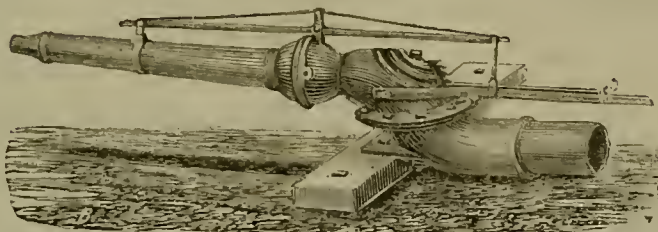
OFFICE—Room 3, 121 Post Street, San Francisco, Cal.

NOTICE TO CONTRACTORS.

Sealed proposals will be received by the Brandy City Mining Company until May 1, 1883, to run a bedrock tunnel to its mining lands, situated at Brandy City, Sierra County, Cal., near the town of Camptonville, Yuba County. Said Tunnel to be about 3,000 feet long, 6 feet wide and 8 feet high, with a grade of 5 inches to every 12 feet. Water Power furnished. Responsible parties only need apply. Privilege reserved to reject any and all bids. For further particulars inquire of

CHAS. ALLENBERG, Sec'y.,
680 Brannan Street, San Francisco, Cal.

Improved Form of HYDRAULIC GIANT



We call the attention of those using or interested in Hydraulic Mining Machinery to the above cut of an improved form of Hydraulic Giant, in which it will be observed that the Deflector and heavy weighting rear part are abolished and a lever attachment, working with a ratchet and pawl substituted, by which the pipeman, standing in the rear of the machine, has, without danger of "backing," full control of the direction and effect of the stream. In an action in the U. S. Circuit Court, entitled F. H. Fisher and Joshua Hendy vs. Richard Hoskins et al. of the Marysville foundry, a permanent injunction has recently been ordered against all persons manufacturing or using any form of Hydraulic Machine having the equivalents of the above. All of the usual sizes are manufactured (under an exclusive right) and for sale at reduced prices by JOSHUA HENDY, at the

JOSHUA HENDY MACHINE WORKS,
49 and 51 Fremont St., San Francisco, Cal.



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VULCAN B B,

Black Glazed Powder,

In kegs and cases. The Best Low Grade Explosive in the market. Contains no Nitro Glycerine. Superior to Judson or any Black Powder made.

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The Strongest, Most Uniform and best Nitro Glycerine Powder manufactured, in which we are prepared to furnish at very lowest prices.

Caps and Fuse of all Grades at Bottom Rates.

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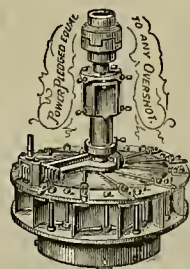


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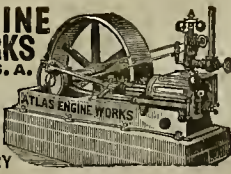
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THE BEST IN USE!



This is the only Scientifically Constructed Bucket in the market. It is struck out from charcoal stamping iron. No corners to catch. No seams to burst. No interior corners to clog up. It runs with great ease, and half the power of the old style bucket. WILL OUT-WEAR HALF A DOZEN OF THEM.

PRICES REDUCED.

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H. P. GREGORY & CO., Agents, San Francisco, Cal., carry a stock of all sizes.

San Francisco Pioneer Screen Works

J. W. QUICK, MANUFACTURER.



Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.
32 Fremont Street, San Francisco.

MINES WANTED.

One Gold, one Silver, and two Copper, for cash customers in England. Must be producing or be developed to some extent, and Expert's Report submitted at owners' expense.

MARS & LAWVER,

45 Merchants' Exchange, San Francisco.

REFERENCES—J. B. Haggis, Louis A. Garnett, John J. Valentia, Anglo-Californian and Donohoe, Kelly & Co.'s Banks.

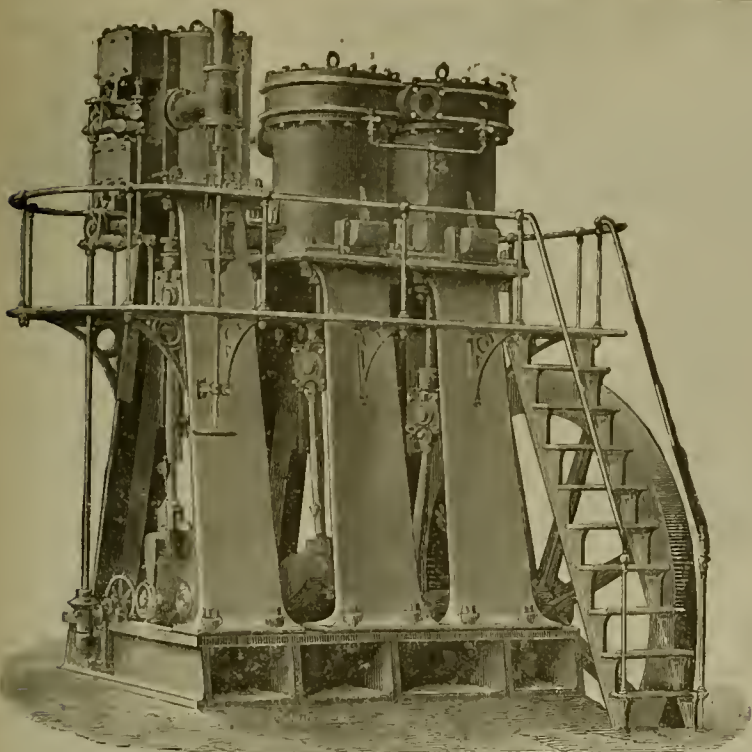
PACIFIC POWER CO.

Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

California Inventors

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This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 509 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorey, 529 Commercial St. S. F.



With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

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AIR COMPRESSOR.

SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

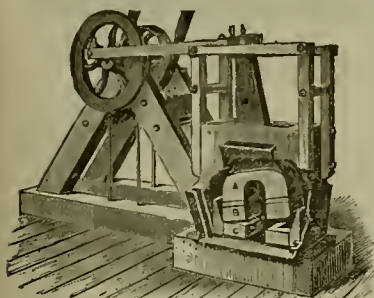
DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

MILL AND MINING MACHINERY.

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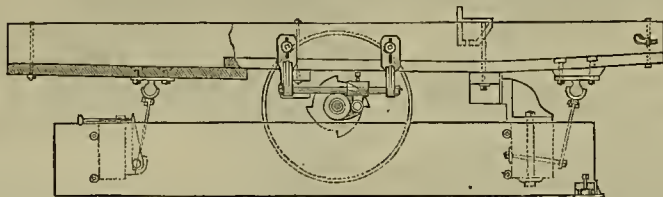
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It has no Stems, Cams, or Tappets, and adjusts itself to the wear of the Shoes and Dies.

For simplicity, economy, durability and effective working, it exceeds anything ever presented to the public, and will do the work of five stamps with one-fourth the power. Awarded First Premium and Medal at Mechanics' Fair, S. F., 1880.

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Improved Patent Grinding and Amalgamating Pans, Concentrators and Gold Amalgamators; also, Steam Engines and Mining Machinery of all kinds. Send for circulars.

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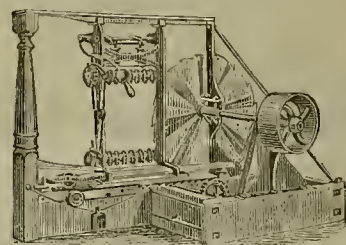


PATTEN'S CONCENTRATOR.

This machine requires less power, less care or attention, and is less liable to get out of repair than any concentrator now in use. All of which any practical miner will comprehend when seeing it in operation.

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SAWMILL MACHINERY,

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Silver Plated

AMALGAMATING PLATES, For Saving Gold.

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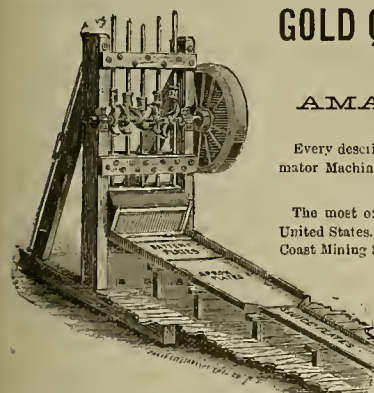
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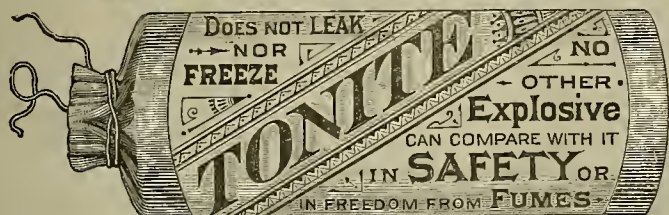
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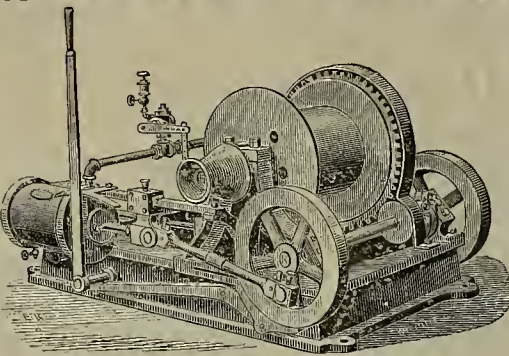
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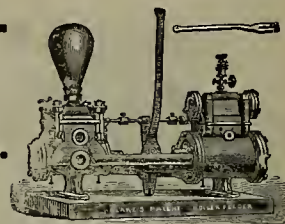
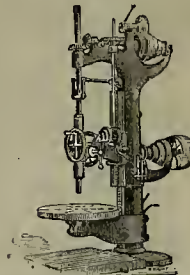
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**BLAKE STEAM PUMP.**
More Than 16,000 in Use.**THE JOHN A. ROEBLING'S SONS CO.,**

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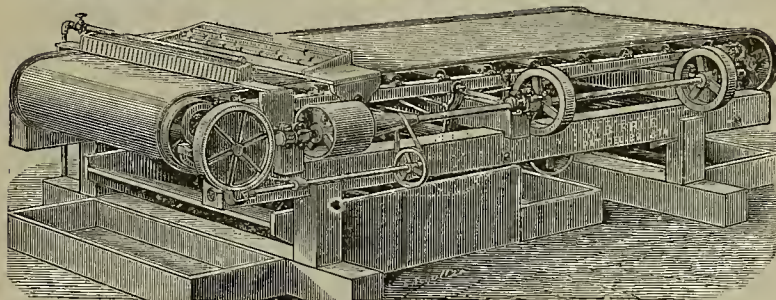
For Inclined Planes, Standing Ship Rigging, Suspension Bridges, Ferries; for Mines and all kinds of Heavy Hoisting; for Stays and Guys on Derricks, Cranes and Shears; for Tilters, Sawmills, Sash Cords, Lightning Conductors, etc.
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\$1,000 CHALLENGE!**THE FRUE ORE CONCENTRATOR,**

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VANNING MACHINE.

Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal.
A machine can be seen in working order, and ready to make tests, at the office of Hinckley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

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Nov 6 1882

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For working flat gravel mines that have no dump.

Sluices gravel and water up hill on an angle of 45°, and will run any kind of gravel that will run in a flume. Handles rocks as easy as fine dirt, and will raise as much material as the water will carry off in a flume on 6 inches grade to 12 feet.

No bedrock cuts, tunnels or drains required. Machine a sufficient drain itself, and the process of mining the same as any other hydraulic mine. Is now a practical success in various places in California and Oregon. Send for descriptive circular to

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Orders may be addressed to us at any of the following places, at each of which we carry a stock.

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And 40 Franklin Street.**ST. LOUIS, MISSOURI,**

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INSURE IN THE**OF CALIFORNIA.****Assets Dec. 31, 1882, - \$1,322,425.45**

Assets and Premium Income Largest of all the Companies Organized West of New York State.

By charging Adequate Rates for its Policies, it is enabled to furnish Solid Indemnity to its patrons, it has but about One Third as much at risk in San Francisco, in proportion to assets, as the average of the other home companies, and its popularity is attested by the fact that it does the Largest Business on the Pacific Coast of any Company, American or Foreign.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 21, 1883.

VOLUME XLVI
Number 18.

Colombian Mines.

There are a number of places in the United States of Colombia where gravel mines exist, and the auriferous deposits are quite extensive. We had a conversation this week with Mr. Thomas H. Folingsby, who lately came from the State of Santander, U. S. of Colombia, and who is about to return to work on some gravel mines belonging to Mr. Joy, of Baranquilla. He says there is a wide belt of gravel extending along the range for some sixty miles. The banks average 200 feet, and there is plenty of water. He says they get about half a cent to the pan. The deposits were discovered in 1872, but have never been worked. The numerous creeks and gulches in the range were worked out by the Spaniards many years ago. All over the country ground sluicing has been carried on, and at each stream are relics of the old miners. The gravel banks were too poor to work, however, and they did not know anything about hydraulic mining. There is some mining carried on now by natives along the rivers, and the women dive for gold with their bateas at most of the streams where there are auriferous beds.

All the work done by the natives is done by ground sluicing or bateas, and with the latter implement they are very expert indeed. Labor is cheap, and some men by hiring 100 or more natives make money. In some parts of Canca, on the Pacific side, quite rich diggings are found.

On the other side, a number of English companies are doing good work, and shipping \$8,000,000 or \$9,000,000 a year from the mines. The English bring practical miners with them, and work for silver, gold, iron, etc., working underground mines. A number of Eastern companies have come down there, too, but most of them have lost a great deal of money. They bring outfits for working gravel and quartz, but have sent inexperienced men to look after their interests, and have not seemed to think it necessary to have any one with a knowledge of mines.

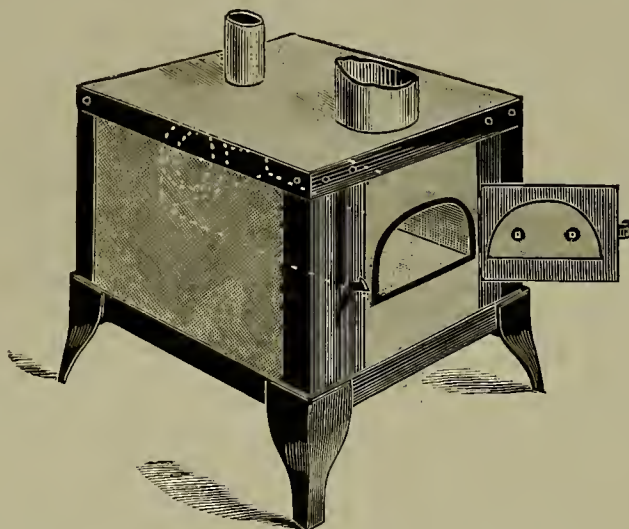
The mines belonging to Mr. Joy are being opened systematically. This gentleman is an Englishman, and quite enterprising, being the life of the region where he is. He is now building a railroad from Santa Martha to Baranquilla, 80 or 100 miles long. Appliances are to be purchased in this city to outfit the mines. There is no snow in the region for poor men, as it takes capital to equip the mines, and labor is nothing. There is an abundance of water and timber, and the climate is healthy.

NEW DISTRICTS.—The Walker Lake Bulletin of April 11th says: The Carson and Colorado railroad may almost be said to be making a country. As its track extends southward new districts come into notice, and old districts which have for years been known to be rich, but which were abandoned because the cost of transportation took away the profits arising from working the mines, again become prominent as certain bullion producers in the near future. Some of these districts, which will soon be ranked among the richest on the coast, have been nearly deserted for years, and were as though they had never been discovered. This was not because it was not known that great quantities of rich ore were to be found there, but because it was impossible to either extract or work it within the limits of reasonable cost, owing to the difficulty of carrying supplies.

Hydro-Carbon Blowpipe and Assay Furnace.

Assayers and chemists in the mining regions have for many years been using the same old form of assay furnace, but a new one has lately been devised and come into use, in which a hydro-carbon is utilized as fuel. A representation of the apparatus is given on this page. In the engraving, *P* is an ordinary force pump, at the bottom of which (at *A*), is a valve which

which such an apparatus may be put. The inventor recommends it to miners and assayers as a very convenient and safe apparatus for all furnace work, such as melting, scorifying, cupelling, fusions in platinum crucibles, (the blast being free from sulphur, etc., has no effect on platinum crucibles), testing of smelting charges, roasting, etc. Consumption of fuel is subject to so many conditions that absolute data can not be given; but in ordinary effective operations, it is stated a gallon will last about eight



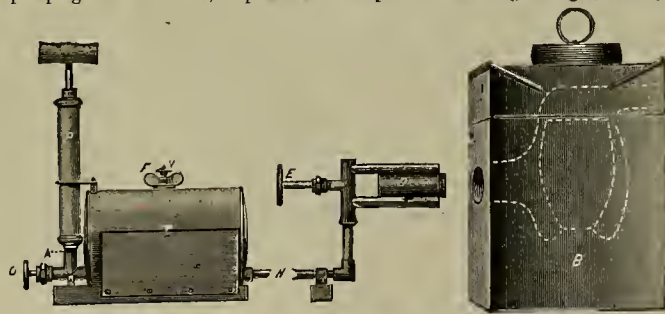
ASSAYERS' PORTABLE MUFFLE FURNACE.

closes automatically upon releasing the pressure from the pump. *C* is a check valve which closes the inlet to the tank, *T*, completely. *F* is the filling screw. *H* is the pipe leading from the tank to the burner, *D*. *E* is the burner regulator terminating in a fine point, closing the orifice of the burner. *B* is the crucible furnace.

Upon pumping a few strokes, a pressure is

hours. Its action can be controlled from the heat of an ordinary Bunsen burner to that required to melt cast iron, etc. The maximum effect can be produced in about four or five minutes from the start.

Mr. Wm. Hoskins, the inventor and manufacturer, 81 South Clark street, Chicago, states that this apparatus will fuse assay charges, samples of smelting charges, scorify, cupel,



BLOWPIPE AND CRUCIBLE FURNACE FOR ASSAYERS AND MINERS.

created in the tank, which forces the fluid through the pipe, *H*, and the tubes of the burner, when it is vaporized by heating the burner, and finally issues from the fine orifice at the end of *E* as a highly heated gas, and burns as such with a powerful blast. After once being started, the heat of the flame passing through the burner vaporizes the fluid in the tubes, and hence it is automatic in its action. The air which is forced in is not used, and therefore it is only necessary to occasionally use the pump to maintain the pressure lessened by the consumption of the fluid, to keep up the blast. This apparatus is manufactured particularly with regard to portability, by a chemist and assayer who understands the various uses to

roast, etc., and will produce the highest heat without any dust or ashes, and without any exertion on the part of the operator. He says it will melt a half pound of cast iron in fifteen minutes with the furnace cold at starting, or ten minutes with the furnace hot; a pound of brass in eleven minutes with furnace cold at starting, and seven minutes with furnace hot.

As the question of cost of all such things is one of great importance to assayers and miners, we will take some figures from the circular, which gives an idea of expense. The crucible furnace weighs fifteen pounds, and takes crucibles from the smallest sizes up to five inches high by four inches at the top, and sells for \$4. This furnace takes Battersea U. or T. cruci-

cibles, or equivalent sizes of other makes, and can be used for cupelling or scorifying, but as only one or two cupellations can be carried on at once, a muffle furnace is made for the purpose. A second size furnace, eight inches by seven inches and nine and a half inches high, without legs, is heavier and better adapted for severe usage. It sells for \$5. The muffle furnace, which we illustrate, weighs twenty pounds, and takes a Battersea muffle five inches wide and seven inches long, costing, including nozzle, \$10, a smaller sized one being \$8. The blowpipe apparatus, complete, weighs seven and a half pounds, and costs \$18. A complete apparatus with No. 1 crucible furnace and No. 2 muffle furnace, packed ready to ship, weighs eighty pounds, and costs \$32. The blowpipe, complete, with No. 1 crucible furnace, costs \$22. Parts may be duplicated. Gasoline of 74° is recommended as the best fuel.

Diving for Gold.

There are a good many ways of mining for gold, and in California we have tried nearly all of them. In hydraulic, drift, placer, bench, bar, and river mining particularly, we are pretty well up. But we have never made a success of getting gold from the beds of rivers when the water was flowing over the bed. We have turned rivers aside and built wing-dams, etc., so as to get at the auriferous deposits, and have worked river beds at low stages of water, but none of our devices for pumping up gold from beneath the river have been successful or practical. Large amounts of money have been expended on dredges and pumps for working river bottoms and various plans have been adopted. In no case, however, has any money been made out of the operation. The failure of one did not deter another, until repeated failures were chronicled. And even now the same old plans are being tried elsewhere that have been abandoned here.

Still there are people who contrive to bring gold up from beneath flowing rivers and make money at it. Down in the State of Canca in the U. S. of Colombia, there are many deposits of auriferous gravel. Most of the small gulches and ravines have been worked out a hundred years ago, though more or less mining is still going on. Many large streams have auriferous beds and the natives are not up to turning the course of the river, so they mine in a peculiar way. The women take a batea in their hands and dive down in ten or fifteen feet of water, scrape the loose sand and gravel into it and bring it to the surface. Then they climb on the bank and "pan" it out. They get all the way from a few cents to four bits a batea. Sometimes the men engage in this work, but it is mainly done by the women. After a dive they set down on the bank and smoke a while before going down again. They teach the children of twelve to dive for gold also. Sometimes rich pockets or deposits are struck. Nobody but natives engage in this sort of work. At the Saragossa, the Clara creek, and the Tewee river a good deal of this mining by women diving is done.

Six Alaska mining companies publish their delinquent assessment lists, the whole making just thirty-one lines. The stockholders are nearly the same in each case. One of the certificates in the General Miller calls for 19,990 shares. Another certificate in another mine is for 13,522 shares, another for 12,322 shares, and still another for 10,495 shares.

CORRESPONDENCE.

Early History of the Comstock.—No. 4.

Sad Reminiscence—First Victim.

EDITORS PRESS:—Without contesting the priority of the first assays of the Comstock ore, allow me to state that it was in my laboratory, then located on Jackson street, above Montgomery, that, on the 28th day of July, 1859, I assisted Major R. Killalee in assaying some black silver ore he pretended to have received from Mexico, the Major at that time not having any smelting and cupelling furnace, occupying only a small desk in Joe French's office, opposite the old Metropolitan Theater. My acquaintance with the Major and Judge Walsh dated from 1854, during my sojourn in Nevada City. Joe French and myself were to have an interest in this mine if proved good, so with a will the black ore was soon pounded and fluxed. The smelting was all O. K., but the cupel buttons were stummers—over \$5,000 to the ton. The Major hardly would believe the results of these assays, although nobody was admitted that day in the laboratory. Again two new crucibles were used for another assay—cupellation nearly same results. The Major did not know what to say, but rather excitedly rapping the table with his cane remarked, "Well, Doc, let us try once more. *Toutes les bonnes choses sont trois.*" (Every one knows the Major could converse in German, French and Spanish languages fluently), and if the results are the same, then you and I will visit again La Belle France. Truly the results were the same. The Major was jubilant and very excited, but still very reticent about the location. It was about 6:30 when we left the laboratory, and we were to meet the next day at 2 p. m., but "man proposes, God disposes." Alas! the Major was found dead next morning, and at 2 p. m. it was my sad duty, as chemist to the Coroner at that time, to assist Dr. Nuttall at the post-mortem examination, which revealed the fact that the cause of death was the rupture of an aneurism of the arch of the aorta. Although, as Mr. A. Paul remarks, "some philosophers say information is wealth," in this case it was death; and thus my poor friend, R. C. Killalee, fell the first victim of Washoe excitement. It was only later in October that I learned the location of the ore from which we had made our assays.

DR. LANSZWEERT.

San Francisco, April 11, 1883.

Fresno County Mines.

EDITORS PRESS:—Having just returned from a somewhat extended visit to a district but little known among mining men I will endeavor to give you some information concerning it, beginning with the Champion gold bearing lead, situated on Big Dry creek, Fresno county, Cal. The Champion lead is not a new discovery, but has been known to the ranchmen and shepherders for many years back, by which it is chiefly owned. And up to within a few months back nothing has been done toward the development of the lead except a few few prospect holes here and there, and the erection of a small four-stamp mill, run in a primitive manner by inexperienced hands.

It remained for Messrs. Anderson and Doak, the enterprising proprietors of the Carlwright mine, to develop to a certain extent the mineral richness of this lead. Their energy and push have enabled them to sink three prospect shafts on their ground, about 200 feet apart. In each of these they have followed the vein about 100 feet from the surface, at which depth the ore was of such quality as to warrant in running a tunnel to intersect the south shaft and to erect a ten-stamp mill on the ground.

They are now taking out about twenty-five tons of ore per day that mills from \$10 to \$14 per ton. The ore is contracted for, and is mined and delivered to the mill at a cost of \$1.65 per ton. The present contractors, Messrs. Ames and Downey, are experienced miners, and express themselves as highly pleased with the outlook in this section. The mill is a steam one, and there is ample water for amalgamating purposes.

The Champion vein is situated in the foothills of the Sierra Nevada, about twenty miles from Fresno City, Fresno county, and has been traced and opened nearly one and one half miles in length. The pay vein varies from two to nine feet in thickness, and I have no doubt that ere long this district will rank among the first in the State.

In my next I will mention other mines in this vicinity, including some splendid copper prospects.

ALBERT P. GABBS.

Gertrude, Fresno county.

FORMATION OF THE SOLAR SYSTEM.—At a recent meeting of the London Physical Society, Mr. Braham gave an experimental demonstration of the vortical theory of the formation of the solar system by rotating a drop of castor oil and chloroform in water until it threw off other drops as planets.

Coal for Arizona.

Now that some of the Arizona mills have already commenced to order coal for future use, in place of the familiar cedar so long in use, a few items concerning the source from which the future supply is to come from may not be amiss. The nearest coal mines to this county are at Gallup, on the line of the Atlantic & Pacific railroad, and some 150 miles west of Albuquerque. The A. & P. railroad obtains nearly all of its coal from the mines at Gallup, and, in fact, uses the larger portion of that produced. The following description of the coal mines, taken from a recent number of the *Albuquerque Democrat* will prove interesting:

The Gallup Coal Mines.

There are at present three prominent producers here. The most important and well developed one is the group of mines owned by Messrs. Pegram, McMillan, Lackey and Weaver. It is situated some two and a half miles from town, on a low foothill formed by an upheaval of vast sandstone layers. There are four distinct veins of coal here, being respectively of a thickness of six feet, five feet ten inches, four feet eight inches, and four feet. These veins lie from twelve to twenty feet apart from each other and are nearly horizontal. The coal is drawn by mules to the surface. The daily average shipment is about 225 tons, which can however be increased at once to much larger proportions. The produce is shipped all along the line as far as Albuquerque, although the Atlantic & Pacific road uses so far the larger portion of it. It is sold for \$2.90 a ton delivered at the cars, and \$3 at retail. There are extensive

Surface Improvements

At this mine, consisting of boarding-houses, stables for the numerous animals, offices, and a substantial chute holding over 200 tons, etc. There are from 80 to 90 men employed, and 26 teams are running all the time, working over 100 animals. A big boarding-house is kept for the accommodation of the employees.

The next producing mine is that of Messrs. M. Bell & Co., about a mile west of town. Here some 25 men are employed, who take out from 50 to 55 tons daily. The vein which is struck at a depth of over 190 feet, is over 6 feet thick, and pitches into the hill at an angle of 35 degrees. The coal is hoisted with a whim, worked by two mules. It is a superior article of lignite, and leaves on burning no clinkers, and only a small percentage of fine red ash.

The remaining producer is Patton's mine, some three miles below Gallup, which ships from sixty to seventy tons a day. There is also, some eight miles distant, at Defiance, Tucker & Talbot's mine, which makes regular and certainly increasing shipments.

Character of the Coal

The product of all these mines is of a bituminous character, but it is very hard and compact, and would, by many a superficial observer, readily be classed as anthracite. In fact, as great depth is obtained, it would not be at all astonishing if veins of regular anthracite should be discovered. It is not a coking coal; there is, as far as heard from, none of that kind in the Territory. But for steam purposes, it is excellent, and for railroad use it can not be surpassed. In one or two of the veins that are at present worked here, there are thin seams of slaty stone running through the coal. They are called "bones," and while they do not interfere with the character of the coal itself, they are somewhat troublesome to the miner, and keep him from getting ahead with his work as rapidly as he could wish. The formation of the low hills which surround the plain in which Gallup is situated is sandstone of various colors, red, brown and gray. The coal veins are usually under and overlaid by thin layers of slate, and occasionally by layers of limestone.

With coal delivered on the cars at Gallup at \$2.90 per ton, we certainly ought to get it laid down at Hackberry or Wallapai siding at \$10 per ton, and we expect to see coal laid down in Mineral Park for about \$17.50 per ton, or perhaps less. At this price it will be much cheaper than wood at \$10 per cord, and will probably supersede it entirely.

Good News for Miners.

We had the pleasure of meeting C. L. Hubbs, the manager of the Gran Quivira Mining and Smelting company, of Albuquerque, New Mexico, during the past week. He has been visiting most of the prominent mines in this and surrounding camps with a view of seeing for himself how much ore there is in this district and acquainting himself with the different grades and qualities which are produced here. He expresses himself wonderfully surprised at the number and size of our ledges, and the richness of the ores they contain, and more especially is he surprised at the amount of ore lying on the dumps of the different mines. He proposes to give the miners such good rates for ore that it will pay every one of them to sort over their dumps and ship the ore that heretofore has been considered worthless. He offers the following prices for ore: Gold, \$18 per ounce; silver, \$1 per ounce; copper, \$1.50 per unit; from 20 per cent. to 30 per cent. lead, 30 cents per unit; from 31 to 40 per cent. lead, 40 cents per unit, and from 41 per cent. upwards, forty-five cents per unit. He charges \$20 per ton for working, and makes no charge for crushing, sampling or assaying in lots of one ton or over, and deducts no discount

or percentages. He has secured terms from the A. & P. railroad, which will allow miners here to ship ore by the carload to his works at Albuquerque for the low price of \$8.50 per ton. At these figures, \$50 ore will net the miner \$21.50 per ton delivered at the railroad, and at these rates there should not be an idle man in the district. To obtain these rates, ore must be shipped in carload lots, but it is not necessary that a carload should be made up from one mine, and three or four or more may join together and make up a carload between them. The ore may be shipped direct to the works or consigned to the Central bank, which will see to the sampling of it and collect and return the money for it. If this does not satisfy the miners of this county, then indeed we shall think they are either hard to please or else too lazy to work.—*Mohave Co. Miner.*

SILK HANDKERCHIEFS AND SORE THROATS.

Sore throats vanish when encircled in a silken kerchief. This is established beyond peradventure. The grandmothers knew all about this a hundred years ago. They believed, too, that silk would cure all other diseases, and some of them thought it would heal a broken leg "if only taken in time." We do not go so far as that, but we know that silk will absorb and store electricity as readily as a Leyden jar. It forms an essential curtain for the electric cylinder, and rubbed with quicksilver, has a mysterious power that imparts force to its retention. The curative force of silk is due to its electricity, and the medical faculty recommend silken hose and shirts for a thousand diseases. As we are not professional, we only take silk by the throat, and know its wonderful powers. We will give a sure recipe: When you have the throat trouble, give a nice, clean silk handkerchief to your sweetheart with a request to tie it around your neck. If you are not cured or choked by tender hands we have made a mistake. The more expensive the kerchief the surer the cure, because your pet takes so long to examine the quality and get it just right, so it won't hurt. Try it and go home cured. We expect silk handkerchiefs will advance in price, when this matter is understood.—*Dry Goods Bulletin.*

PRIZE FOR AN IMPROVED SAFETY LAMP.—Ellis Lever has offered a prize of \$2,500 for a perfect safety mining lamp. The conditions are now before us, and we heartily trust that the deposited award will never revert to the philanthropic donor. The money has been deposited with the Central Board of the Miners' National Union, to be, pending the award, vested in three trustees. The lamp must be perfectly portable, electric or other lamp, which the miner can carry from place, and which will not under any circumstances whatever cause an explosion of gas. The lamp must be submitted to the judgment of five gentlemen, impartially chosen, who are best qualified to decide, and the offer will remain open to the close of the present year. If the "perfect lamp" is not produced, Mr. Lever will have the money returned to him.—*Mechanical World.*

MICA PRISMS.—At a recent meeting of the Physical Society, Mr. Lewis Wright read a paper on the "Optical Combinations of Crystalline Films," and illustrated it by experiments. He exhibited the beautiful effects of polarization of light, and the Newtonian retardation by means of plates built up of thin mica films and Canada balsam. The wedges thus formed gave effects superior to those of the more expensive selenite and calcite crystals. The original use of such plates is due to Mr. Fox, but Mr. Wright showed many interesting varieties of them, including what he termed his "optical chromotrope," formed by superposing a concave and one fourth wave plate on each other. Norenberg's combined mica and selenite plates were also shown.

AN OLD STORAGE BATTERY PATENT.—Electricians are interested at present in the discovery, in the Patent Office of a patent issued February 6, 1861, to C. Kirchhoff, a New Yorker, for an electric battery which presents all the features of the storage batteries in use at the present day—lead plates immersed in acidulated water, which becomes coated with the oxide of lead. The principle appears to be the same as that of the Plante (French) storage battery, and the storage batteries now in market must hereafter rely upon peculiarities of construction instead of comprehensive claims.

Indian Question.

The Indian question is up again. The terrible Apaches are on the war-path, in paint and feather, murdering men, women and children, and desolating the country, merely to appease a brutal appetite for robbery and blood. The Government troops, as usual, are galloping over the country trying to drive these savages back upon the reservations. The Arizona editors, wearied out of patience by these frequent outbreaks, think the time has come to exterminate the savage tribes, and the San Francisco *Examiner* winks approval. This gives the *Argonaut* a spasm of sentiment; it says the Indian usually goes upon the war-path to seek revenge for the cruel wrongs he has received, and advises the Arizona editors to kill off

the gamblers and cowboys before they wildly scream over the offenses of the desperate red men.

At every Indian outbreak the question comes up, what shall be done with the hostile savages? and remains unanswered, and seems likely to remain so for some time yet. The aim of the law, both in its enactments and execution, is to protect the good element of society from the encroachments of the bad, and supplant the bad with something better. To know how to segregate the good from the evil, and promote the growth of one and discourage the growth of the other, is the first step in all wise legislation. Is civilization, then, better than barbarism? This is the first question that meets us in discussing Indian affairs. Of course we must assume the affirmative, for were the converse of the proposition true or even doubtful, then the most stupendous blunder and outrage has been perpetrated by building a nation of fifty millions upon the hunting grounds and fishing privileges of a few hundred thousand savages. Were we to take the narrowest view of civilization and the highest view of the savage state, it would still be clearly apparent that the latter must give way. The law must protect the best. Destiny has decreed it. And in the race of life the best wins, and the weak and inferior must go to the wall. Hence, in determining what to do with the savages, the policy of the Government should be decidedly in the interest of civilization. The life of one settler on the frontier is worth more than a tribe of these barbarous marauders and murderers. And yet the Government has strangely and uniformly pursued a course that has tended to preserve the savage condition of the aborigines. Whenever the interests of civilization and barbarism have come in conflict the sympathy of the majority remote from the field of bloodshed and atrocity has come to the support of the savage. A mawkish literature embalmed him as a martyr. Poetry and song wailed his woes. The coarse, brutal, treacherous savage chief, whose wigwam dangled with the scalps of white men, found himself a hero at Washington, and well received by the authorities. No doubt the Indian has often been the victim of wrong, but the kind of sympathy we find lavishly expended in such works as "A Century of Dishonor" and in the speeches of Boston philanthropists, is of that soft-hearted, flabby, puerile sort, that sends bouquets and dessert to atrocious murderers, and coddles and apologizes for a polygamous reprobate.

The recognition of these savage, nomadic tribes as sovereign powers to be treated with in a diplomatic way, has been the leading error of our governmental policy. The treaty-making power is one of the highest acts of nationality. With the Indians it is a huge farce. Think of a Commission of disguised Ambassadors of a great nation on one side, and a few savage chiefs, dirty, lousy, lazy, repulsive creatures, meeting on the same plane to negotiate a treaty! The whole scene is supremely ridiculous, and only tends to pamper the self-importance of the chiefs strengthen tribal relations, and destroy every sense of gratitude and responsibility to the Government.

Then our present system of reservations, corralling a lot of "bucks" and squaws upon a small slice of territory, has proven a miserable failure. It amounts to but little more than training and fattening the restless Indians during the winter, for the war-path in the spring, and the more peacefully inclined become lazy, shiftless, dissipated and worthless. Judge Henry C. Dibble, a leading citizen of Arizona, in his open letter to the President, points out in a forcible way the folly and wickedness of quartering savage tribes in the midst, or in the vicinity of civilized communities, and unless the policy of the Government soon becomes more vigorous and effective, we could hardly blame the citizens of Arizona for promptly settling this question as the citizens of Minnesota did a few years ago.

MECHANICAL PROGRESS.

Explosions Made by the Squeezer.

Persons who have no knowledge of iron rolling mills have often been surprised on passing them by numerous cannon-like explosions within. These explosions are the cause of much conjecture, and for the benefit of those who do not yet understand how they are produced, I will attempt an explanation of them. Before I proceed with my explanation, however, it will be necessary to briefly describe the process of making, for example, merchant iron.

The puddling process is the conversion of cast or crude iron into wrought iron, and the puddler and the puddling furnace are the instruments employed to effect the change. After the iron has been prepared in the puddling furnaces, it is taken out very hot in balls weighing from 175 to 200 pounds, and thrust into a machine called a squeezer, which carries the ball around until it (the ball) has described a horizontal circle, and then ejects it, the ball emerging from the machine in the shape of a sugar loaf. The ball is now called a puddled bloom. It is next taken to the puddle rolls, and rolled into a bar of any dimensions required. The next thing done in the process of manufacture is to cut the bars into pieces to make piles of weights desired, and then roll the iron into merchant iron.

The explosions occur while the iron is passing through the squeezer, and are caused by running water on the machine to keep its heat down, and thereby prevent unequal expansion. During the passage of the metal through the machine the compression is so great that the fluid sinder is expelled from the metal, and the water coming in contact with it creates a gas which explodes with a loud report. These explosions can be avoided by running the squeezer dry, but, for reasons above stated, water is run on the machine while in operation.

The Working of Soft Steel.

Mr. Barnaby, Admiralty Inspector at Sheffield, has made a series of very interesting experiments, with the object of determining the influence of heat upon the strength of iron and steel. The test pieces of open-hearth Bessemer steel and iron were furnished by C. Cammel & Co., and by John Brown & Co., and Mr. Barnaby describes very fully the results obtained and the means employed to secure specific temperature.

Mr. Barnaby insists that the results obtained are such as to dissipate all doubt as to the practicability of using soft steel in boilers, and under all circumstances where it may be exposed to high temperatures. Very thorough experiments seem to have established the fact that Bessemer steel heated to about 400° F., increased its tensile strength ten tons per square inch, while the elongation diminished only one thirtieth; high temperatures do not seem to augment the tensile resistance of open-hearth cast steel in the same degree, while the elongation is about equally diminished. This increase in strength and diminution in elongation continue up to about 600° F. Tests at still higher temperatures are wanting, yet at 880° F., the elongations were found to be in excess of the requirements of the Admiralty.

Mr. Barnaby has also carried on experiments with a view to determine the required treatment of pieces which had been subjected to punching, shearing and upsetting, in order to counteract the effects produced by these manipulations. The total results of his experiments show that the working of steel offers no more uncertainties than that of iron, if the precaution is taken to heat the piece, after working it to a cherry-red and then dip it either into boiling water or into oil. Immediately after this mild tempering, and just as soon as the piece has acquired either the temperature of the water or the oil, it may be put into the structure. Mr. Barnaby concluded from his experiments, that this form of tempering completely eradicates the effects of shearing and punching.

A NEW ELEVATOR BRAKE.—Edwin C. Post, of Toledo, Ohio, has constructed a new style of elevator which has passed a severe test successfully. Its peculiar advantage over others is that the air is compelled to act as a brake, giving a yielding force and stopping the car quickly but gradually. The test consisted in putting on much more weight than its given capacity, raising it to the top of the building, then severing the supporting cables. The car with its heavy load, unsupported, dropped only six feet, when it stopped gradually in a descent of four or five feet, and remained stationary. The cables were again attached and other tests given, the car making fast or slow ascents and descents as desired.

A NEW TOOL.—A convenient little tool has just been patented in Germany for boring a hole through an opening much smaller in diameter than the hole itself. The tool consists of a shank in which small knives are concealed; the shank is inserted into the hole, a spring at the end is pressed, and the knives spring out of the shank to the required distance. They are, of course, curved and shaped so that they work together on the same principle as an auger.

INDURATED WARE.—The manufacture of indurated ware is a new industry, and Portland claims to own the only works of the kind in existence, the factory of the concern being located near Waterville. The articles manufactured are washbowls and pails, though lamps have been made, and attempts are being made to manufacture spool heads, and various other articles. The material used is wood pulp, made from spruce at a manufactory in Boston, and the same as used for the manufacture of paper. The ware is thus practically paper ware, as the pulp is treated the same as though it was to be made into paper; though at this point everything changes. The pulp, instead of passing through the rollers of a paper machine, flows into a mold capable of exerting a pressure of 3,500 pounds, and in three minutes the jaw of the mold drops and a washbowl or a water pail drops out. When thoroughly dried in the atmosphere the bowl or pail is passed into a machine fitted with the proper forms and subject to a pressure of 500 tons, from which it emerges with a shape that cannot be changed. Though comparatively smooth, the articles are next sandpapered on a machine making 1,200 revolutions per minute, and then treated with a chemical preparation that outwardly changes them into a substance resembling horn, and in which condition they may be immersed in boiling water for hours without change.

SAW MANUFACTURE IN PARIS.—Some of the Paris saw manufacturers have introduced some improved processes of treating both the teeth and the blades, the latter after being rolled cold several times, in order to render the grain close and the metal homogeneous, are heated in special furnaces, from which the air is carefully excluded, and which at a proper temperature are plunged into a bath of colza oil, this being done in a dark chamber. The tempering is effected with the aid of machines, which cause the blades to pass between cast iron plates, heated to a fixed temperature, according to the quality of the article to be produced. The teeth of the saws are cut out by machinery, which requires only laborers to attend it; the planishing and grinding of circular and other saws are also accomplished by machinery with great advantages on the score of regularity and stiffness. Another feature to be noted is the mechanical reduction of the joints of ribbon saws by grinding instead of filing, this being done longitudinally instead of across the blade, thus securing perfectly uniform thickness.

STEEL FORGING.—At a recent meeting of the Newcastle-on-Tyne Chemical Society, a paper was read on the "Variation in the Composition of Steel Forgings," which gave the results of a series of analyses made to ascertain if there was any difference in chemical composition between the central parts and the surrounding material of steel forgings. Samples of metal were taken from a forging of seven and three fourths inches in diameter, and formed from an ingot three tons in weight. These were submitted to analysis in the laboratory, great care being taken to obtain comparative results. The tests showed that impure metal was contained within a radius of one and one half inches from the center. The general conclusion from numerous other experiments, is that those parts of a steel forging corresponding to the part near the top and bottom ends of an ingot are homogeneous in their composition, and those parts of the forging corresponding to the middle of the ingot contain a core of accumulation depending upon the size of ingot and the rate at which it cools.

EXPANSION AND CONTRACTION OF IRON WIRE. Some of the anomalies presented in the expansion and contraction of iron wire, as observed by metallurgists and chemists, have led to the conclusion, recently, that in steel and iron containing free carbon, there is a contraction or shortening which is excited by heat, and which proceeds simultaneously with the dynamical expansion and marks its true amount—this being divisible into high and low temperature contraction. In cooling a strained iron wire from redness, it was found that the contraction due to cooling was, at a certain point and for a limited period, changed into action of elongation; in good iron wire this irregularity has not been detected, but in hard wire and steel is very apparent. The wire has to be raised to a very high temperature before the temporary elongation during cooling is visible, nor does it take place if the wire is heated only just beyond the temperature at which it occurs.

A NEW METHOD OF MANUFACTURING BELTS or bands for machinery, which comes from Paris, is applicable to rubber, woven tissues of gutta-percha, and consists in making the belt in longitudinal ribs or grooves, the main object of which is to increase the capacity of the belt on the same cross section, say twelve inches, by the extra strength put in the same space, and also to prevent so much stretching and variation. Another modification of the same invention is grooving one side of the belt the same as saw teeth, then putting these two pieces together, leaving a plain bearing surface for contact besides, thus making a double belt, which is less liable to stretch or to warp. Especial machinery is built for the purpose, and the claim for it is that better contact is given. The pores are closed during this grooving process, the belts have a higher resisting power, and do not twist on the pulleys. The grooves may be regular, irregular, spiral, or crossed.

SCIENTIFIC PROGRESS.

Influence of Metals on the Oxidation of Oils.

Metals have in certain cases been found to exert a remarkable influence on the oxidation of oils. Quite recently M. Livache, of Paris, used in this relation finely divided metal, such as is obtained by precipitation, instead of metallic plates, and the effect was found to be greatly increased. He thus tried lead, copper and tin, and found lead to have the strongest action. If lead moistened in oil be exposed in air, an increase in weight is very soon observed, and this is greater the more siccative the oil. With linseed oil the increase of weight reaches a maximum in thirty-six hours, whereas, exposed alone to air, the oil would take a much longer time to reach this maximum. A solid and elastic product is obtained. With non-drying oils the increase of weight is much less, and takes much longer to be completed. The result in question, M. Livache points out, cannot be attributed to a simple division of the matter, allowing more active circulation of air, for the same experiment made with various other substances in fine division does not result in any like increase of weight; the effect is merely like that in the case of a thin layer of oil exposed to air. The change in the other case must be attributed to a direct action of the metal. Operating with different oils, M. Livache found the increments of weight proportional, except in the case of cottonseed oil, to those observed in the fatty acids of the oil exposed to the air for several months. He suggests that industry may derive certain advantages from the facts observed. Thus a rapid method is indicated of distinguishing drying from non-drying oils. Further, the heating of oils might be advantageously replaced by a circulation, in contact with air and in the cold state, over iron or fine plates having precipitated metallic lead on their surface. The oils so obtained would be always less colored, and would retain great fluidity, while the objectionable odors and the danger of fire which attend the present mode of treatment would be avoided.

Theory of Magnetism.

In the year 1879, Prof. D. E. Hughes, F. R. S., communicated to the Royal Society of London, a paper "On an Induction Currents Balance and Experimental Researches made therewith." He continued his researches into the molecular construction of metallic bodies, and communicated the results then obtained in three separate papers bearing upon molecular magnetism.

From numerous researches in this direction he gradually formed a theory of magnetism entirely based upon experimental results, which led him to the following conclusions:

1. That each molecule of a piece of iron, steel, or other magnetic metal, is a separate and independent magnet, having its two poles and distribution of magnetic polarity exactly the same as its total evident magnetism when noticed upon a steel bar magnet.
2. That each molecule, or its polarity, can be rotated in either direction upon its axis by torsion, stress, or by physical forces, such as magnetism and electricity.
3. That the inherent polarity or magnetism of each molecule is a constant quantity like gravity; that it can neither be augmented nor destroyed.
4. That when we have external neutrality, or no apparent magnetism, the molecules, or their polarities, arrange themselves so as to satisfy their mutual attraction by the shortest path, and thus form a complete closed circuit of attraction.
5. That when magnetism becomes evident, the molecules, or their polarities, have all rotated symmetrically in a given direction, producing a north pole if rotated in this direction, as regards the piece of steel, or a south pole if rotated in the opposite direction. Also, that in evident magnetism, we have a still a symmetrical arrangement, but one whose circles of attraction are not completed except through an external armature joining both poles.

THE SENSE OF DIRECTION IN ANIMALS.—The remarkable faculty which cats, dogs, pigeons, and other animals possess, of returning in a straight line to a point of departure, has awakened much curiosity on the part of naturalists. Some refer it to instinct, some to intelligence similar to that of man, some to an internal mechanism which makes the animals simple automata; but none of these attempted explanations do anything towards solving the mystery. Wallace supposed that when an animal is carried to a great distance in a basket, its fright makes it very attentive to the different odors which it encounters upon the way, and that the return of these odors, in inverse order, furnishes the needful guide. Toussend supposes that birds recognize the north as the cold quarter, the south as the warm, the east (in France) as the dry, the west as the moist. Viguer, in the *Revue Philosophique*, publishes an original memoir upon the sense of orientation and its organs, in which he attributes the faculty to a perception of magnetic currents.

Constitution of the Sun.

In a paper recently presented to the French Academy, Faye gives his reasons for believing that our sun and the other large self-luminous heavenly bodies have not yet arrived at either a solid or a liquid state, but are gaseous all the way to the centers. Otherwise, he says, the heat radiated from them would not be so quickly replaced by heat from within, and the surface, consequently, would soon become covered with a solid, non-luminous crust.

Cagniard-Latour has proved by means of some very remarkable experiments that a gaseous mass can acquire the density of a liquid without changing its state of aggregation, provided both temperature and pressure are high enough at one time. If, then, the external strata of the solar atmosphere, where all matter is in an elementary or dissociated state, should cool sufficiently for the elements to enter into chemical combination, if the vapors of metallic calcium, magnesium, and silicon, mixed with oxygen there, on cooling should form clouds of lime, magnesia, and silica, for example, these clouds would sink to the interior, where they would again be dissociated, while at the same time they would drive the hotter particles upward, so that an approximately uniform temperature would be maintained until the whole mass had gradually cooled to such an extent as to assume the liquid and afterwards the solid state.

Faye bases his hypothesis on the spectroscopic observations of many years, and on Carrington's study of sun spots, which show that the currents are all in zones parallel to the equator, while there are none from the equator toward the pole. Besides this, the flattening of the sun and the slow motion of the sun spots near the poles are more easily explained on this hypothesis of Faye than on those hitherto in vogue.

A NEW SECONDARY BATTERY.—Secondary batteries are now rapidly multiplying in number, and among recent inventions in that direction we would mention a new form of battery proposed by Messrs. Liardet and Donnithorne, of London, England. The main features of the appliance, as stated by the inventors, are the intermixture of porous lead, deposited either by direct action by means of a galvanic current, or by the action of spelter with oxides and salts of lead, such as may be produced from galena or other lead ore, as the acting substance of the plates, to accumulate the current. This mixture is placed on very thin plates of pure lead, which serve as conductors, and is kept in position by porous plates. Great stress is laid upon the purity of the lead and lead compounds, as by this means the inventors seek to avoid local action and to increase the intensity and durability of the battery. An experimental set of cells recently tested consisted of fifty elements, each of which had an area of one twelfth of a square foot, the weight of the set being 315 pounds. The cells, having been charged with a dynamo, are reported to have given a current of twelve amperes with an electro motive force of ninety-five volts. The inventors claim that they have produced a secondary battery or accumulator of half the weight, half the cost and nearly twice the power of any other.

GOD IN NATURE.—In a recent scientific lecture, Prof. C. A. Young, the astronomer, of Princeton College, used the following language: "Do not understand me at all, as saying that there is no mystery about the planets' motion. There is just the one single mystery—gravitation—and it is a very profound one. How it is that an atom of matter can attract another atom, no matter how great the disturbance, no matter what intervening substance there may be; how it will act upon it, or at least behave as if it acted upon it, I do not know, I cannot tell. Whether they are pushed together by means of an intervening ether, or what is the action, I cannot understand. It stands with me along with the fact that when I will that my arm shall rise, it rises. It is inscrutable. All the explanations that have been given of it seem to me merely to darken counsel with words and no understanding. They do not remove the difficulty at all. If I were to say what I really believe, it would be that the motions of the spheres of the material universe stand in some such relation to Him in whom all things exist, the ever-present and omnipotent God, as the motions of my body do to my will—I do not know how, and never expect to know."

ORIGIN OF THUNDER-STORMS.—Spring attributes the appearance of a thunder-storm to a sudden condensation of atmospheric vapor, not into a mist but into hail. The source of the electricity is the rupture of the adherence of the air to the particles of hail; the electric influence then carries the electricity, which was accumulated upon each particle of ice, to the particles which form the limit of the frozen region. Abbe Moigno fears that this theory rests on a vicious circle, for the condensation of water, under the form of hail or rain, can only take place by reason of an electric discharge. All the secret of thunder-storms is to be found in a nimbus encountered by a very cold, very dry and highly electrified cirrus.—*Les Mondes*.

LEAF WORK.—It appears that the leaf of a plant can transform into useful work as much as forty per cent of the solar energy it receives and absorbs.

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ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T	SALE.	SECRETARY.	PLA	OF BUSINESS
Albion Con M Co.	Nevada.	13.	50.	Mar 6.	Apr 9.	Apr 30.	R L Shainwald.	327 Pine st	
Alta S M Co.	Nevada.	25.	50.	Mar 10.	May 15.	Jun 4.	W H Watson.	302 Montgomery st	
Argenta M Co.	Nevada.	15.	25.	Mar 20.	Apr 23.	May 14.	E M Hall.	327 Pine st	
Bodie Con M Co.	California.	2.	50.	Mar 5.	Apr 16.	May 16.	G W Sessions.	309 Montgomery st	
California M Co.	Nevada.	7.	20.	Feb 27.	Apr 6.	May 4.	C P Gordon.	309 Montgomery st	
Challenge Con M Co.	Nevada.	2.	10.	Mar 27.	May 2.	May 23.	W E Dean.	309 Montgomery st	
Chollar M Co.	Nevada.	11.	50.	Mar 27.	Apr 30.	May 2.	W E Dean.	309 Montgomery st	
Con Pacific M Co.	California.	6.	15.	Mar 22.	Apr 30.	May 23.	F E Luty.	330 Pine st	
Day S M Co.	Nevada.	12.	30.	Mar 13.	Apr 12.	May 4.	E M Hall.	327 Pine st	
Elko Con M Co.	Nevada.	1.	15.	Apr 10.	May 15.	Jun 7.	F Sperling.	309 California st	
Eureka Con M Co.	California.	3.	100.	Mar 16.	Apr 19.	May 14.	P Jacobus.	309 Montgomery st	
Grand Prize M Co.	Nevada.	13.	25.	Mar 15.	Apr 16.	May 7.	E M Hall.	327 Pine st	
Independence M Co.	Nevada.	10.	30.	Mar 5.	Apr 10.	May 2.	J W Pew.	310 Pine st	
Julia Con M Co.	Nevada.	18.	10.	Apr 10.	May 14.	Jun 4.	H A Charles.	419 California st	
Justice M Co.	Nevada.	38.	10.	Feb 27.	Apr 4.	Apr 23.	R E Kelly.	419 California st	
Martin White M Co.	Nevada.	14.	25.	Mar 22.	May 2.	May 31.	J I Scoville.	309 Montgomery st	
Mount Potosi M Co.	Nevada.	9.	25.	Mar 21.	May 7.	May 28.	H Sayer.	330 Pine st	
Potosi M Co.	Nevada.	11.	25.	Mar 21.	Apr 24.	May 13.	W F Dean.	309 Montgomery st	
Scorpion M Co.	Nevada.	15.	10.	Apr 6.	May 10.	May 31.	G R Spiny.	310 Pine st	
Sierra Nevada S M Co.	Nevada.	76.	100.	Mar 20.	May 2.	May 21.	E L Parker.	309 Montgomery st	
Silver King M Co.	Nevada.	2.	00.	Feb 20.	Mar 20.	Apr 23.	L J O'Farrell.	SE Montgy & Wash'n	
Tip Top S M Co.	Arizona.	5.	25.	Mar 8.	Apr 16.	May 14.	H Deas.	309 Montgomery st	
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Summit M Co.	California.	10.	10.	Mar 16.	Apr 30.	May 25.	R N Van Brunt.	213 Pine st	
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Buchanan G M & M Co.	California.	2.	05.	Mar 30.	May 2.	June 1.	P J Sullivan.	421 Post st	
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McMillen S M Co.	Arizona.	5.	20.	Mar 8.	Apr 12.	May 1.	J Morizio.	328 Montgomery st	
Napoleon M Co.	California.	7.	10.	Mar 18.	Apr 10.	Apr 28.	H B Smith.	307 Montgomery st	
San Pedro M Co.	Arizona.	8.	05.	Mar 6.	Apr 10.	May 2.	H Deas.	309 Montgomery st	

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Buchanan S M & M Co.	California.	2.	05.	Mar 30.	May 2.	Jun 1.	P J Sullivan.	121 Post st
Lima Con S M Co.	Arizona.	5.	05.	Apr 4.	May 15.	Jun 5.	R D Hopkins.	436 Montgomery st
Lucky Hill Con M Co.	Nevada.	2.	10.	Apr 2.	May 4.	Jun 4.	H A Unrich.	37 Ellis st
Melones Con M Co.	California.	1.	250.	Mar 7.	Apr 9.	May 1.	E M Hall.	327 Pine st
McMillen M Co.	Arizona.	5.	20.	Mar 8.	Apr 12.	May 10.	J Morizio.	328 Montgomery st
Napoleon M Co.	California.	7.	10.	Mar 13.	Apr 10.	Apr 28.	H B Smith.	307 Montgomery st
San Pedro M Co.	Arizona.	8.	05.	Mar 6.	Apr 10.	May 2.	H Deas.	309 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Con Imperial.	Nevada.	W E Dean.	309 Montgomery st.	Annual.	May 2
Morgan M Co.	California.	C L Tilden.	806 Market st.	Annual.	May 6
Shawmut M Co.	California.	J F Batten.	316 California st.	Special.	May 2

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bulwer Con M Co.	California.	W Willis.	309 Montgomery st.	.05.	Apr 12
Contention Con M Co.	Arizona.	D C Bates.	309 Montgomery st.	.25.	Apr 28
Jackson M Co.	Arizona.	D C Bates.	309 Montgomery st.	.10.	Apr 17
Kentuck M Co.	Nevada.	J W Pew.	310 Pine st.	.10.	Apr 19
Nevado M Co.	Nevada.	J W Pew.	310 Pine st.	.50.	Apr 16
Northern Belle M & M Co.	Nevada.	N Willis.	309 Montgomery st.	.50.	Apr 16
Silver King M Co.	California.	J Nash.	315 California st.	.25.	Apr 15
Standard Con M Co.	California.	Wm Willis.	309 Montgomery st.	.25.	Apr 12

Table of Highest and Lowest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar 28.	WEEK ENDING Apr 4.	WEEK ENDING Apr 11.	WEEK ENDING Apr 18.
Alpha.	1.20 1.30	1.15 1.25	1.75 1.85	1.11
Alta.	40c 45c	40c 45c	25c 45c	25c
Andes.	50c 60c	55c 65c	5c 6c	45c 60c
Albion.	10c 15c	10c 15c	60c 65c	37c
Argenta.	55c 65c	50c 60c	55c 60c	55c 70c
Alta.	65c 90c	60c 70c	65c 85c	75c 85c
Belding.	3.60 3.70	3.70 3.85	3.85 3.95	3.25 3.35
Best & Belcher.	1.00 1.10	1.00 1.10	1.00 1.10	1.00 1.10
Bullion.	65c 80c	65c 80c	65c 80c	65c 80c
Belcher.	65c 80c	65c 80c	65c 80c	65c 80c
Belle Isle.	85c 95c	85c 95c	85c 95c	85c 95c
Bodie.	12c 15c	10c 15c	10c 15c	10c 15c
Banton.	12c 15c	10c 15c	10c 15c	10c 15c
Bodie Tunnel.	10c 15c	10c 15c	10c 15c	10c 15c
Challenger.	5c 10c	5c 10c	5c 10c	5c 10c
California.	5c 10c	5c 10c	5c 10c	5c 10c
Challenge.	49c 50c	49c 50c	49c 50c	49c 50c
Caollar.	1.10 1.20	1.40 1.50	1.20 1.30	1.40 1.50
Confidence.	1.10 1.20	1.40 1.50	1.20 1.30	1.40 1.50
Con Imperial.	45c 50c	50c 55c	45c 50c	45c 50c
Con Virginia.	90c 1.20	85c 90c	1.10 1.20	1.25 1.35
Crown Point.	1.00 1.10	1.00 1.10	1.00 1.10	1.00 1.10
Div.	1.00 1.10	1.00 1.10	1.00 1.10	1.00 1.10
Elko Con.	5c 10c	5c 10c	5c 10c	5c 10c
E. M. Diablo.	5c 10c	5c 10c	5c 10c	5c 10c
Eureka Con.	5c 10c	5c 10c	5c 10c	5c 10c
Eureka Tunnel.	75c 75c	80c 75c	90c 40c	85c 85c
Eschsch.	25c 32c	25c 32c	25c 32c	25c 32c
Eschsch.	55c 60c	45c 55c	45c 55c	45c 55c
Grand Prize.	2.30 2.60	2.45 2.70	2.35 2.60	2.30 2.30
Gould & Curry.	3.35 2.60	2.55 3.3	2.75 3.20	2.90 3.05
Hale & Norcross.	35c 70c	35c 70c	35c 70c	35c 70c
Holmes.	40c 50c	40c 50c	40c 50c	40c 50c
Independence.	10c 15c	10c 15c	10c 15c	10c 15c
J. H. Hill.	10c 15c	10c 15c	10c 15c	10c 15c
Justice.	10c 15c	10c 15c	10c 15c	10c 15c
Jackson.	1.00 1.10	1.00 1.10	1.00 1.10	1.00 1.10
Kentuck.	40c 50c	40c 50c	40c 50c	40c 50c
Martin White.	1.00 1.10	1.00 1.10	1.00 1.10	1.00 1.10
Mono.	10c 15c	10c 15c	10c 15c	10c 15c
Mexican.	3.10 3.85	2.55 2.95	3.00 3.65	2.85 2.85
Mr. Diablo.	3.25 2.75	3.00 3.60	3.75 3.75	3.50 3.50
Mr. Potosi.	1.00 1.10	1.00 1.10	1.00 1.10	1.00 1.10
Noonday.	9.50 9.5	8 9.5	8 9.5	8 9.5
Northern Belle.	1.75 1.85	1.35 1.30	3.55 2.30	3.05 3.05
North Noonday.	40c 50c	40c 50c	40c 50c	40c 50c
North Belle.	1.75 1.85	1.35 1.30	3.55 2.30	3.05 3.05
Ophir.	2.55 2.00	2.30 2.30	2.40 2.35	2.70 2.20
Oerman.	15c 25c	20c 20c	25c 25c	25c 25c
Oro.	85c 85c	90c 115c	125c 75c	90c 90c
Potosi.	1.25 1.40	1.35 1.40	1.65 80c	80c 80c
Pinal.	2.05 2.20	2.05 2.05	2.20 1.85	2 2
Savage.	2.25 2.25	2.25 2.25	2.25 2.25	2.25 2.25
S. B. Belcher.	2.25 2.25	2.25 2.25	2.25 2.25	2.25 2.25
Sierra Nevada.	1.00 1.10	1.10 1.10	1.10 1.10	1.10 1.10
Silver Hill.	10c 15c	10c 15c	10c 15c	10c 15c
Silver King.	10c 15c	10c 15c	10c 15c	10c 15c
Scorpion.	50c 50c	50c 50c	50c 50c	50c 50c
Sierra Nevada.	1.00 1.10	1.10 1.10	1.10 1.10	1.10 1.10
Syncline.	1.00 1.10	1.10 1.10	1.10 1.10	1.10 1.10
Tuscarora.	1.00 1.10	1.10 1.10	1.10 1.10	1.10 1.10
Union Con.	3.85 4.70	3.35 3.60	4.30 3.75	3.75 3.75
Ward.	2.30 1.65	2.15 1.85	2.01 1.65	1.81 1.81
Wales.	20c 25c	20c 25c	20c 25c	20c 25c
Yellow Jacket.	2.25 2.35	1.50 2.95	2.70 3.10	2.30 2.85

Sales at San Francisco Stock Exchange.

THURSDAY, A. M., APRIL 19.	150 Yellow Jacket.	2.8
100 Albion.	50c	
5 Argenta.	55c	
190 Belcher.	70c	
120 Bodie.	1.30	
400 Belle Isle.	35c	
220 B. & Belcher.	35c	
30 Belmont.	1.30	
80 Confidence.	1.40	
165 Crown Point.	1.20	
140 Con Virginia.	40c	
50 Chollar.	1.00	
50 Eureka Con.	50c	
100 Eschsch.	25c	
600 Eureka Tunnel.	50c	
720 Grand Prize.	2.30	
300 Gould & Curry.	1.50	
520 Hale & Nor.	3.00	
60 Mexican.	2.00	
55 M. White.	1.00	
100 Navajo.	2.30	
50 Ophir.	2.00	
270 Pinal.	75c	
130 Potosi.	95c	
100 Scorpion.	50c	
425 S. Nevada.	2.20	
100 Savage.	1.90	
10 Silver King.	1.00	
600 Union.	3.10	
15 Utah.	1.70	
100 Wales.	20c	

Mining Share Market

There is little of interest to refer to in the share market at present. Our tables show all the fluctuations on the Comstock.

At the north end, prospecting operations are going on at several points, but as yet no developments worthy of special mention have been made. Frequent seams and streaks of quartz have been cut that give low assays, and some from which samples that would assay high might be taken, but these being mere feeders, it would be injudicious to make any excitement about them, for, after each little rally, there would be sure to be a relapse, and more harm than good would be done. Just as soon as anything likely to be of permanent value is found in any one of the north end mines, the public will be allowed to see and judge for themselves.

At the middle mines some very interesting explorations are now being made. The Hale and Norcross folks are thoroughly exploring to the southward the streaks of quartz cut by the north drift on the 2600 level, near the east wall, and are finding ore that will pay well for milling, though as yet the deposit is of no great width. In going further south, or upward or downward, these streaks are likely to bulge out and form a valuable workable deposit. It also remains to follow the ore streaks to the northward. No one can tell in what direction a deposit of ore may lie. All that can be done is to hunt for it.

At Gold Hill the leading mining companies are extracting much low grade ore from the old upper levels, all of which is milled and pays a small profit.

Mc CARTHY'S ANNUAL STATISTICIAN.—This valuable and unique publication has just reached its seventh annual volume. It is the only publication which comes anywhere near being an *omnium gatherum* of all really useful statistical information, and its importance and usefulness has been recognized everywhere that the English language is spoken, and, to a large extent, wherever civilization extends. It has been universally approved by all educational institutions and authorities to whose attention it has been brought. The present volume is as full of interest as ever, and, if possible, more valuable than any preceding edition. It contains 624 pages crowded with important facts, statistics and useful information. Published by L. P. McCarthy, 706 California street, San Francisco. Price, \$4.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Hanauer, April 10th,	\$3,620;	Alice, 10th,	\$7,760;	Horn Silver, 10th,	\$18,000;	Bullionville, 10th,	\$9,288;	Ontario, 10th,	\$12,163;	Alice, 11th,	\$10,517;	Ontario, 11th,	\$8,100;	Bullionville, 11th,	\$7,242;	Horn Silver, 11th,	\$12,000;	Hanauer, 12th,	\$1,650;	Alice, 12th,	\$8,757;	Horn Silver, 12th,	\$14,258;	Bullionville, 12th,	\$7,870;	Horn Silver, 12th,	\$12,000;	Ontario, 12th,	\$6,220;	Ontario, 14th,	\$6,480;	Bullionville, 14th,	\$5,414;	Horn Silver, 14th,	\$12,000;	Hanauer, 15th,	\$1,830;	Horn Silver, 15th,	\$9,000;	Bullionville, 15th,	\$5,820;	Ontario, 15th,	\$0,250;	Syndicate, 14th,	\$4,368 92;	Christy, 16th,	\$4,276;	Bodie Tunnel, 17th,	\$1,995;	Contention, 14th,	\$21,330.
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The receipts of bullion in New York city from the mines in 1882 is given at \$21,793,298.38.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

SUTTER CREEK.—Cor. Amador Ledger: At the Mahoney the machinery of both mine and mill is again in motion. Timbers, cordwood, wedges, etc., are being taken out of the drift in large quantities, and what they were sent down for is a mystery. But few men are employed at present, but the number is being increased almost daily, warranting the belief that before many weeks have passed the force will come up to its old standard. Ten stamps of the mill were started yesterday morning. They are running on rock taken principally from an open cut near the mill. It is estimated to yield at least \$6 per ton, and, as the expense of getting it to the mill will be trifling, the prospects of a remunerative run are flattering. Repairing the shaft of the Amador mine is progressing slowly. It is a difficult job, and will require a month more to complete it, and enable sinking to be prosecuted. Thirty stamps of the mill are running on quartz from an open cut near the shaft, which is said to be of fair quality.

MISCELLANEOUS.—The Kelly mill has completed the crushing of rock from the Vaughn mine, which joins the Kelley on the east. The clean-up has not been finished as yet, but we are informed that everything indicates a satisfactory yield. W. F. Walton has made arrangements with James Morgan to crush, at the Kelly mill, 5,000 tons of ore from the latter's claim near by. It will take three months to run through this quantity. The Oneida gravel claim is being vigorously worked; two parties with sluice boxes, and a giant playing on the auriferous dirt. W. E. Stewart has purchased the four-stamp battery of the old Kearsling mill in Jackson. He is removing the same to a quartz claim a quarter of a mile north of Big Bar bridge. He has a ledge from 3 to 6 ft wide, which he expects to yield \$5 per ton.

PLYMOUTH NOTES.—Cor. Amador Dispatch, Apr. 14: We have been looking at the mines in this part of the county in the last few days, and are satisfied that the best mines in Amador county are the Empire and Pacific mines, at Plymouth. There is more activity about these mines, and there is no doubt that they pay better than any other, (the Keystone not excepted,) and there is an abundance of the same kind of quartz ledges that can be had cheap for cash, that will certainly pay just as well if the parties working the same would do like Hayward and go down 1300 or 1400 feet. That seems to be the secret of success in these mines, and Mr. Hayward, having experience, goes after them in the right style every time, and is always a successful miner, never to our knowledge having made a failure. The Amador Pacific mine of this place is, beyond a doubt, the richest mine in the county, and very likely the richest mine in the State, and very extensive, and will last for years to come. It is only a few days ago that we were informed that a body of ore about 20 feet wide had been struck in the Pacific that would pay \$20 to the ton, that was running directly into the Empire mine works, and is supposed to be a new body of rock not known before. This will be sure to give the Empire a new impetus, as the ore taken from the Empire has been of low grade. The Pacific mill is a fine structure running 40 ten-hundred pound stamps, and containing concentrators of the most approved pattern. The mill is run by water obtained from the Amador Canal Co., at a very heavy expense, but is considered much cheaper than steam. The Empire mill is an 80-stamp mill, also run by water, and capable of doing as much work as any mill of the same size in the State. The whole business is under the management of Mr. Montgomery, General Superintendent for Hayward, Hobart & Co. The Vatican mine is on a range about one mile west of the Empire and Pacific ledge, on what is known as the old Ocher lead, and the same range extends into El Dorado county, and is known as the Spring Hill range in El Dorado county. There are several companies besides the Vatican Co. working on this lead, and are all making good wages. There is sure to be more interest taken in the mines that are in and around this place, as there are richer deposits here than in many places where large sums are squandered annually. Some people hint that the mines hereabouts would have been developed long ago but for the interference of some very highly interested parties that want to grasp the entire mining interest of Amador county.

BUTTE.

A DEMAND FOR MINES.—Butte Record: Judge L. C. Granger, of Oroville, who was a prominent member of the late Assembly of California, arrived in Chico last evening. The judge said that he was on a tour of inspection of the Butte creek mines, he having been sent out by San Francisco and Eastern capitalists. The judge said that there is a greedy demand for hydraulic mines where the debris can be impounded or deposited where it will not injure adjoining property. Little interest is being taken in quartz mining of late, capitalists not caring to risk a fortune in a mountain of rocks, even though good mineral does crop out. The judge informed a Record reporter that there is a renewed activity in mining all along Feather river, and one is reminded of the old days, when the river was worked with windmills, flumes or rockers. Claims are daily being taken up along that stream, and worked with good results. Old Butte county is still running over with gold, and it is not very hard to get at, either. Mr. Granger said that W. H. Farley, of Concord, was in Oroville yesterday, and employed 40 men to work in the Duensing claim, on the North Fork of Feather river, above the Big Bend tunnel. This claim has been panning out big results. Its owners will windmill the river. The Big Bend tunnel, the greatest mining experiment ever undertaken in the State, is now in over a distance of 1,000 ft. When completed it will be two miles and a half long.

CALAVERAS.

ROYAL.—Mountain Echo, April 14: J. F. Curtis, who some months ago sold a quartz mine in Salt Spring valley, has recently purchased another called the Royal mine, which is situated in the same district. He states that the ore from this mine yields from \$10 to \$18 per ton. Twenty tons of the ore has lately been shipped to New York for the purpose of thoroughly testing the mine.

REPAIRING MILL.—Calaveras Chronicle: The gravel mill on the Rough Diamond mine, in Chili gulch, has been stopped for repairs. A cam was broken some two weeks ago. A new cam was obtained, but, when about to put the cam in place, it was found that one end of the cam shaft was cracked for a considerable distance. As the shaft was originally intended for ten

gaged during the winter sinking shafts at various points and otherwise prospecting the company's ground, by which means it has been ascertained that over 200 acres of the ground is good, with an area 3,000x1,500 ft in extent, and most conveniently situated for washing, that is very rich.

GRIZZLY.—About a month ago work was resumed in the tunnel of the Grizzly mine, situated just above town and on the south side of Mill creek canyon. The tunnel is now in about 120 ft, and is being steadily pushed along the footwall of the vein, which is a large one. Some fine ore has been encountered in the line of the tunnel.

MONO RATTLENAKE.—Harry M. Hartley and Horace Warner are making preparations for sinking a joint incline shaft on a small but very rich quartz vein traversing what was the richest placers of the Old Mono diggings.

MAY LUNDY.—Supt. Kellogg arrived Thursday, and on Friday placed 30 odd men on the road between the mine and mill to shovel out the road for the quartz teams, which are expected here to-morrow or next day. The heavy snow storm of two weeks ago caused an avalanche, which damaged about 180 ft of tramway.

JAW-BONE MINING MATTERS.—The few men at Mount Gibbs are supposed to be still at work, though the regular monthly pay day has again been passed—for the sixth and all preceding months. The great "Ontario Syndicate tunnel," started in this district under the same jaw-bone development auspices, was closed more than a month ago, because the miners working there concluded that one whole winter was long enough for them to work for a speculator without means.

IS BIER.—Work on the Great Sierra tunnel, Tioga, is progressing as usual. The Mono Lake Hydraulic M. Co. has a good supply of water, and is pushing work accordingly. The mill of the Summers Con., Sweetwater, has been increased to 15 tons capacity, and is turning out an increased quantity of bullion. Ore is being taken from the winze, 30 ft below the main level and 370 ft below the surface, and the mine is showing well.

NEVADA.

MORE SLICKENS.—North San Juan Times, April 14: A blast of 13½ tons of Judson powder—about 500 cases—was let off at the American mine on Thursday evening last. This will supply the valley people with slickens for some time.

STRUCK A STRINGER.—*Foothill Tidings*, April 14: Besides the copper mining in and around Spenceville there is considerable prospecting going on for gold quartz. We learn from Mr. Green that the Bismark Co., who are running a tunnel on Albion hill, struck a fine quartz stringer, and that they intend following it to a large quartz ledge located by the company. The stringer is a good-sized one, and prospects well. The San Francisco copper mine, at Spenceville, is doing well.

A DRIFT CLAIM SPECIMEN.—*Grass Valley Union*: A piece of solid gold was taken out of G. S. Brown's drift gravel claim at You Bet the other day which weighed 1¾ ounces. This is the largest piece ever taken from the ground, although it has been prolific in quarter and half ounce pieces, and, in fact, is one of the richest claims in the county.

PLUMAS.

TAYLOR-PLUMAS MINE.—*Greenville Bulletin*, Apr. 11: The result of the recent run on ore from the dump was not so profitable as had been expected. The previous run on ore taken direct from the mine came fully up to all that Mr. Bransford had looked for. A very marked and most favorable change has occurred in the face of the main tunnel. All the way in the ground had been exceedingly hard and difficult to work, but lately the character suddenly changed; the ground has become soft, and most of it can be worked with the pick; whereas, before this change every pound of the rock had to be torn out with powder. As was to be expected, when softer ground was entered, the ledge matter widened out; in the hardest ground there were places where the ledge was not much over one foot wide; now it is about five feet wide. This is not all solid ore, but consists partly of stringers with soft dirt between.

CRESCENT MINE.—When the Cherokee property was attached and sold, Mr. Davis bought a lot of machinery for which he paid \$300; the lot included a mine pump, gear wheels and shafting. The machinery was taken to the Crescent mine and set up, the pump being worked by steam power. In the mean time preparation was being made to utilize the shafting and gear wheels for doing the work of pumping and hoisting by water power instead of steam; this now is accomplished. Two hurdy wheels are so arranged that one runs the pump and the other the hoisting gear. The power is under as complete control as if supplied by a steam engine. Should the necessity arise to use steam, the engine can be employed by simply joining the connecting rod with the crank pin. In the mill 12 stamps are running. From the dump a few pieces of ore were picked up haphazard, and when these were washed off they were found to be thickly spotted with gold.

GREEN MOUNTAIN MINE.—But little work has been done in the mills during the past week. The ditch sustained damage in several places from the storm, and till these were repaired the water had to be shut off. The same cause kept the air compressor idle, so that not much progress has been made in the tunnel since our last issue. The ditch is now fully repaired, however, the water is turned on again, and work in the mills and tunnel going ahead as usual. About the end of this month the tunnel will reach the ledge.

SHASTA.

SOUTH FORK.—*Cor. Shasta Courier*, April 14: Robinson & Co. have relocated the Big Central and are taking out some excellent ore. A test run, just completed, gave full satisfaction. The indications are favorable for a permanently paying mine. J. B. Strong is mining again, with good prospects. Crum's arastra is running on Wright & Hoskin's ore. E. L. Ballou's arastra is running on Smith & Cooper's ore, but will start on Dunham & Kingsbury's in a few days, as Post has nearly finished packing their ore over. Smith & Cooper's arastra is well under way, and will be completed soon. A tunnel is being run on the Manzanita to tap the shaft; it will take about ten days more to make the connection. Smith & Mosher are sinking on a promising ledge northwest of the Hope, R. A. Brown reports plenty of water in Salt creek. Himself and partner have opened up their ledge in good shape, and have 50 or 100 tons of ore in the slope. Their arastra was running smoothly.

TUOLUMNE.

BONDED.—*Tuolumne Independent*. C. F. Draper, of Oakland, and Oliver Holden, of San Jose, have bonded a one sixth interest of A. Stoddard, and also a one sixth interest of E. C. Herbert, in the Rising Sun copper mine, about four miles southeast of Jacksonville, for \$1,500 for each share, paying down \$500 in cash on each, and the balance of \$1,000 to each party to be paid on or prior to January 31, 1884. The parties agree to work the mine as soon as they can arrange with other owners, and money due may be paid out of the first net proceeds of said interests.

WASHOE DISTRICT.

UNION CON.—*Enterprise*, April 14: At the east end of the joint Sierra Nevada east crosscut, on the 2900 level, a chamber is being cut out for a large winze, which will be sunk to the 3100 level.

MEXICAN.—The east crosscut from the 3100 station, joint with Ophir, has passed through the black porphyry, and is now in vein material of a favorable appearance which contains streaks of quartz that yields low assays.

HALE AND NORCROSS.—A drift has been run south on the 2600 level between the seams of quartz cut some time since near the east wall. From this drift cross-sections have been made east and west. The seams have been found to widen somewhat, and ore is found which assays as high as \$90. A drill hole has been run west, from which material assaying \$30 has been obtained.

POTOM.—Explorations are being made with the diamond drill from the end of the south drift on the 2600 level. Thus far a good deal of water has been found and it has been necessary to plug up some of the holes and start in a new direction.

CON. VIRGINIA.—Work is still in progress in the southeast drift on the 2500 level but it is intensely hot at the face, and it may be necessary to discontinue drifting for a time in order to allow the hot water to drain out.

SIERRA NEVADA.—A chamber is being excavated at the east end of the joint Union Con. east crosscut on the 2900 level, from which a large winze will be sunk to the 3100 level.

ALTA.—Work is now progressing at both ends of the drain drift which is to connect the shaft with the Sintro tunnel.

OPHIR.—The joint Mexican east crosscut from the 3100 station has passed through the belt of black porphyry which forms a kind of horse in the vein, and has now entered the usual channel of vein material.

NORTH GOULD AND CURRY.—The rock at the bottom of the shaft continues to work well. It shows occasional seams of quartz of a good appearance.

GALENA DISTRICT.

STRIKE IN THE McEWEEN TUNNEL.—*Battle Mountain Messenger*, April 14: "A rich strike was made in the McEween mine, at Galena, last Saturday, by the miners working in the main tunnel. The face of the tunnel is nearly all ore, and about three feet of it is very rich. Persons who have seen the bonanza say that it is the richest prospect that they have ever seen. The tunnel is now in nearly 1,000 ft, well timbered, where necessary, with a good track and cars, but little water to retard operations, and the ground is easily prospected. About 135 ft of ledge carrying rich galena ore is exposed in the tunnel, which, at the present face, is about 200 ft in depth from the surface, giving a fine bank for a slope. The full extent of the new find cannot be estimated at present, but it should certainly cause a stir in the camp and be the means of inducing those interested in mines to thoroughly prospect their claims. The McEween mine is owned by Messrs. Blossom & Foster, who have expended considerable capital in opening up their mine, and now will be amply repaid for their expenditure. We are satisfied that there are many more properties in the vicinity just as valuable, if developed."

REESE RIVER DISTRICT.

STRIKE IN THE MANHATTAN.—*Reese River Review*, April 16: A very valuable strike was made this morning, at the bottom of the Paxton incline, at a depth of 1,500 ft. The ledge is large and mostly of a high grade. It shows well in ruby silver and staphanite, and the piece of ore shown us will assay considerably over \$2,000 per ton. This is the most valuable strike made on Lander Hill for some time past, and proves the continued permanency as depth is attained. This development will inspire renewed confidence in the old reliable Lander Hill, and bring good cheer to all in any way interested in Reese River Mining District.

SACRAMENTO DISTRICT.

ORE.—*Silver State*, April 14: Sacramento district, which is situated in the Humboldt range about 10 miles from Rye Patch, is receiving considerable attention from mining men at present. The Boston and Philadelphia mines, recently sold to Oakland men by H. J. Bender, are producing considerable ore which assays from \$50 to \$1,000 per ton. The purchasers intend building a 10-stamp mill on the mines just as soon as the machinery can be brought from San Francisco. R. H. Hope and Jack Bennett, who have been for years prospecting and developing mines in the district, have sold several claims and bonded others. In early days rich ore was found in many places in Sacramento district, and quite a little village, which was first named Williamsburg, and afterwards changed to Lima, sprung up. The latter became known among the miners as Limerick, and that is the name the canyon is now called. The village was abandoned and the buildings, which were principally built of stone and mud, fell into ruins, Hope and Horn being the only persons, who resided in the camp for years.

Arizona.

DOS CABEZAS.—*Cor. Tombstone Republican*, April 14: The future great gold camp of Arizona is not gaining that pre-eminent position as rapidly as we had anticipated. There is but little activity in mining matters to record. The late Indian outbreak has borne its usual fruit, and claim owners have not yet recovered from the feeling of despondency caused by that event. We know the result will be the discouragement of capitalists, who otherwise might take hold of some of the promising prospects in this vicinity, and the consequent postponement of our days of prosperity to an indefinite period. But not-

withstanding this, confident of the superiority of our district, the people are in the main not discouraged.

AN ASTONISHING RUN.—*Silver Belt*, April 14: The Takoma smelter stopped running on Wednesday. It will be idle for a short time. During the last 21 hours they ran 16,000 pounds of copper bullion; and in 45 hours, 20,000 pounds of copper and 17,000 pounds of matte. The matte carries 84% of copper, which would make an actual product of that metal, for the 41 hours, of 43,280 pounds, or a fraction over 1,055 pounds an hour. The largest known product in 24 hours, before this performance, was in the case of the Old Dominion, when they produced about 21,000 pounds. It must be borne in mind that, in the case of the Takoma, as in that of the Old Dominion, only one 30-ton water jacket was used, and the ore was not selected with a view to making a phenomenal record. Globe challenges the world to equal it.

THE TOTAL WRECK MINE.—The mine is located within eight miles of Pantano, on the S. P. railroad, and is only a few hours ride from Tucson. From the depot to the mine there is a good road of easy grade. Quite a town has grown up, and a large number of people are employed. The greatest depth reached is 340 ft. Between that and the surface are four levels, all of which have developments which prove the continuity of the ore body. On one of the levels the ore breast showed 27 ft, and on of the walls only—the footwalls—had been reached.

DOS CABEZAS.—*Cor. Tombstone Epitaph*, April 14: The copper mines of this district are exciting capitalists by their wonderful developments of the past month. Scarcely a day passes but some new find is reported, and so the interest increases day by day. Many of the mines can show ore that will run 40% copper and \$200 silver. Some ore was on exhibition in town to-day from the Copper Whale, owned by Charles Williamson, Corey and Porter, that will run almost 60% copper and over \$100 silver, and beside this high grade ore there is in this mine an immense amount of ore that will run 15% to 20% copper. The intrinsic worth of this and other mines of the district in gold, silver and copper is fully one half greater than many mines in more inaccessible places that have created such excitements. The Dos Cabezas mines are all comparatively easy of access, only 14 miles from the railroad, plenty of water near the mines for smelters or mills, and the actual value of the mines must call at no distant day the attention of capitalists and mining men, then many will wonder why such valuable properties were allowed to lay idle so long. Among the other promising copper prospects is the extension of the Copper Whale, owned by P. A. Boyer; also a copper mine owned by John Burt, on the north side of the mountain. John Casey is getting ready to start his arastras on ore from the Juniper mine. Johnson has done a great amount of work on the Silver Cave mine this spring. He has taken out several tons of rock for his arastra mill. Some of the ore goes as high as \$80 gold, and some as low as \$14 gold. The \$14 ore is quarried down from a ledge forty ft wide that stands out of the ground nearly one hundred ft. The \$80 ore is taken from a ledge in the back end of crosscut tunnel.

Colorado.

THE GRANT SMELTER.—*Denver Journal of Commerce*: The Grant Smelter shipped upwards of half a million in bullion in the month of March, and will increase the output the present month. The books of the concern show that \$545,050 was the March product, and is the largest shipment ever made in one month by any smelter, mill or other reduction works in Colorado. The amount of ore treated was 8,350 tons. The amount of bullion shipped during the month represents very closely the month's product, as the bullion is shipped with little or no delay, and does not accumulate from one month to another. It was produced in eight stacks. The new ninth stack has been running for about a week but did not effect last month's product. The average daily work of a stack is therefore the reduction of 33½ tons of ore. It is not likely that a much higher average than this could be reached. The average amount treated daily is 270 tons. The highest amount treated in one day during the month was 307 tons, or 38½ tons to the stack. This is a fair test of the actual capacity of the stacks with the charges then used, as they were running under a blast pressure which caused the slag to spout from the tap-hole in a stream that fell clear off the gutter which usually conducts it to the slag-pots. The new stack is similar to the others and consequently with similar ore and a smooth run there will probably be over 9,000 tons treated during the present month and over \$600,000 of bullion produced.

Idaho.

WOOD RIVER REGION.—*Ketchum Keystone*, April 6: The ore in this region is generally galena and gray or sand carbonates, with an average assay of 100 ounces per ton. The general direction of ledges in the northwest and southeast, pitching, if at all, westward. The general formation is porphyry and lime. All are well located for natural advantages.

WARM SPRING CREEK DISTRICT.—The Irwin situated on Warm Spring creek, 15 miles distant from Ketchum, is developed by means of 500 ft of tunneling, and presents an average ore body of 2 ft. Upwards of 1000 tons lie dumped ready for shipment, 8 men have been employed to date, and the prospects are favorable for an increased force immediately.

POOR MAN, one and one half miles southeast of the Irwin, and owned by independent parties, is located in Poor Man's gulch. At present being lightly prospected, it is developed by a 150 ft tunnel which shows in its breast a fine ore body.

WEST FORK, owned and operated by the same company (Philadelphia) is 7 miles distant and is developed by means of several surface cuts, and at the present time is being tapped by a 500 ft tunnel at a depth of 1000 ft. Two hundred and twenty-five tons of good ore lie on the dumps of the Black Hawk, an adjoining claim which runs parallel to the former and consists of a very similar vein. Average width 8 ft; grade, 90 ounces. Amount of work done, 252 ft shaft. Force employed to date, 10 men. Probable force for the season much larger. The Penbrooke is another very promising prospect of the same company situated near the Irwin, which will be worked by a moderate crew during the summer. The Night Hawk joining the Black Hawk on the northwest, and owned by Messrs. Connor McLeod and McGregor, is developed by a 70 ft shaft and 2 tunnels respectively 30 and 40 ft, disclosing a vein very similar to that of the latter being a continuation.

THE ONTARIO.—This mine is owned by the W. S. C. M. Co., is situated in the Boyle Mountain vicinity about 15 miles distant. The mine has undergone considerable development, having been worked all last summer by 10 men and a small force during the winter. There is about 650 ft tunnelings. The breast of the main tunnel exhibits a fine ore body with an average width of 30 inches. Several hundred tons of good smelting ore lies on the dump ready for shipment. The grade is higher than is usual in that region, often going over 200 ounces per ton.

Montana.

MADISON CO. MINES.—*Madisonian*, April 10: Mr. Henry Miller, who has been engaged during the last winter in developing the quartz mines in Barton's gulch, furnishes us with the following items from that promising district, which is situated a short distance from Virginia City. The most extensively developed mines in the district are the Black Eagle, owned by J. W. Morris, Kyle Bros. and C. Gibbons; the Gray Eagle, Capt. W. L. Southmayd; the True Fissure, Gibson & McCullough; the Zelra, Hyndman & Jobb; the Palmyra, A. Garrett; the Old Union, K. T. Cook, and the Little Annie, Henry Miller. The Black Eagle is situated up the gulch, about four miles from the Ruby valley road. It is opened by three shafts, one of which is 170 ft deep, showing ore which assays \$230 per ton; the second, 250 feet eastward of No. 1, is about 40 ft deep, in a three-foot vein of similar rock, and the third has been started 150 ft further east, and shows a two and a half-foot crevice. The ore is easily worked, and a shipment to Salt Lake netted \$122 per ton to the shippers. About 300 ft above this mine is the Gray Eagle, which has been bonded to an Eastern company, which has a representative now on the way here, with instructions to thoroughly develop the mine this season. From the showing already made, there is a strong indication that it is a first-class mine. Half a mile east of the Gray Eagle is the True Fissure, opened by a shaft and tunnel, and showing a good quality of ore. It has a six-foot crevice. The Zelra is 400 yards east of the True Fissure, and Messrs. Hyndman & Jobb have sunk a 100-foot shaft on the mine, and have run a tunnel 150 ft. The latter will tap the lode this spring. Half a mile southeast of this is the Old Union, a very extensive mine, being over 40 ft between the walls, with good ore in sight, and plenty of it. The Palmyra, 200 yards above, also shows a good body of rich ore. The Little Annie has been opened by two shafts, and has a wide vein. The ore body is large, two and one-half ft on the hanging wall, and one foot on the footwall, being very rich. Messrs. Emery & Garrett are working on the Agriola, with very good prospects. Several other lodes have been discovered in the district, and are quite promising in appearance, though not yet developed to any great extent. The lodes are gold and silver bearing, with some galena and copper, and are unmistakably permanent and true fissure veins. The work already done shows that the district presents an inviting field for the investment of capital in the erection of reduction works, and, when this is done, we may look for a lively mining camp in that neighborhood.

THE DRUM LUMMON.—*Inter-Mountain*, April 12: In the magnitude and uniform richness of its ore body, the Drum Lummion mine, in Marysville district, in Lewis and Clarke county, is, perhaps, without a peer in Montana among the gold and silver mines, and it is most gratifying to know that it is to be worked on a scale commensurate with its known value. While the Drum Lummion is not a developed mine of ascertained permanence and strength of ledge like the Lexington and other prominent silver mines of Butte, the surface workings have shown up such immense deposits of ore, which is in some places 10 ft wide, that its right to be called a great property cannot be reasonably disputed. Even, with the present limited openings in the mine, the extraction of 100 tons of ore per day for several years would in no sense tax its productive capacity, from which statement of fact it readily appears that the company is taking no chances in making the expenditures necessary for the erection of a 60-stamp mill, which we learn on good authority has been fully determined upon. The old mill, with which Uncle Tommy Cruse has been pounding away on Drum Lummion ore for several years past and getting out about 40% of its value, will also be refitted, and will be used to make test runs on the several qualities of ore which may be discovered in the mine, in order to demonstrate the grade of its milling character. The Drum Lummion is an immense property, and, with good management, its development will result in immense profits to the stockholders.

New Mexico.

COPPER MINE SALE.—*Southwest Sentinel*, April 14: We are reliably informed that the sale of the Burro Mountain district copper mines and the extensive works of the Valverde and Queen City Cos., that has been pending for some time past, has just been consummated and that the money has all been paid into the hands of the trustees, to be turned over as soon as the necessary title papers can be made out, and the usual preliminary arrangements gone through. The claims sold, include the entire property of the Queen City Co. and of the Valverde M. & S. Co. and 60 other mines, covering in all 9 square miles of mineral land. This sale is one of the most important that has occurred in New Mexico for many months, the actual price paid being \$1,500,000 in cash. The English Co. has reserved \$1,000,000 for a working capital to open and develop the mines and to extend and enlarge the reduction works already erected.

Utah.

THE MINING OUTLOOK AT PARK CITY.—*Salt Lake Tribune*, April 14: The Apex M. Co., is a corporation formed under the laws of Utah Territory, and comprises eight patented claims, viz. Brave Columbia, Constitution, Cumberland, Monroe Doctrine, Hannah, Antelope, Gazelle and Daylight, and portions of other claims which have been patented. This group of claims contain an area of over fifty acres, and adjoin the Crescent and Walker and Webster properties. In fact, the three properties lie together. Since the formation of the Co., work has been pushed forward on the property with gratifying results. The mining outlook at the Park is promising at this time, and with the shipment of ore from the Crescent, and the output from the Ontario, the present year will add considerable to the bullion product of the Territory.

The Prospects of the Comstock Lode.

To the San Francisco Stock and Exchange Board—Gentlemen: Your investigating Committee beg leave to submit the following report as to the condition of the Comstock mines:

We have found it impossible to obtain any reliable official information with reference to the condition of the mines, and the little we have been able to glean from that source is anything but satisfactory. This is owing to the secrecy with which all explanatory work is carried on, through the medium of the diamond drill, which has been extensively used in almost every mine on the lode, while the result of such explorations is kept a profound secret by the operators, who have obtained control of the different companies, chiefly by means of proxies, which have been voted at the annual elections. While the State laws have made it imperative, on the part of the superintendents, to report to the companies' officers all discoveries made with the diamond drill, we find that they have, in almost every instance, disregarded the law, contenting themselves with privately reporting such discoveries to operators who have obtained such control, while having little, if any, moneyed interest in the companies. This is a matter of grave import to the stockholders of the companies, who, while paying enormous sums for the purposes of exploration, are debarred all knowledge of, or benefit from any discoveries which may be the result of such expenditures. It is true, that reports are made to the secretaries of

drained. Nothing but the grossest carelessness could cause any damage from water. So far as we are able to judge from the vague reports in the different offices, and what reliable information we have been able to obtain from other sources, there is every probability that some of these mines will be on a dividend-paying basis ere long, and the long suffering stockholders be relieved from the terrible exactions in the shape of assessments under which they have groaned for such a length of time.

These mines are splendidly equipped with machinery of the finest and most substantial character, their pumping machinery being unequaled in the world. The mines are opened to great depth, the deepest workings being in the Mexican and Ophir, on the 3100-foot level. They have large and substantial shafts and winzes, and are opened laterally with large drifts for about two miles, and so well arranged and connected as to make danger from fire a very remote contingency.

For about a mile north of Savage, no explorations of any importance that we are aware of have been made on the lower levels until very recently, when several crosscuts were started, one of which encountered ore on the line of the Union Con. and Sierra Nevada of great promise, and we have good reason to hope that when further explored it will prove a real bonanza. The other crosscuts so far give good indications, and we expect to see paying ore developed by them.

The Savage, Hale & Norcross, Chollar, and

will say that in our next report we will deal more fully with the subject of mine management. In conclusion we would say that the prospects and conditions of the mines on the Comstock lode have not been so good for years, and that we believe that in the near future the Comstock lode will be restored to the proud position it once held as the greatest bullion producer on the globe.—M. J. McDonald, Marcus P. Hall, Sam'l Dixon, J. McKenzie, J. M. Shotwell, R. F. Rogers, Coll Deane.

The report was placed on file. A discussion was held regarding the advisability of publishing the committee's report and it was decided that it was inexpedient for the Board, as a Board, to officially authorize the publication of a report submitted at a private session.

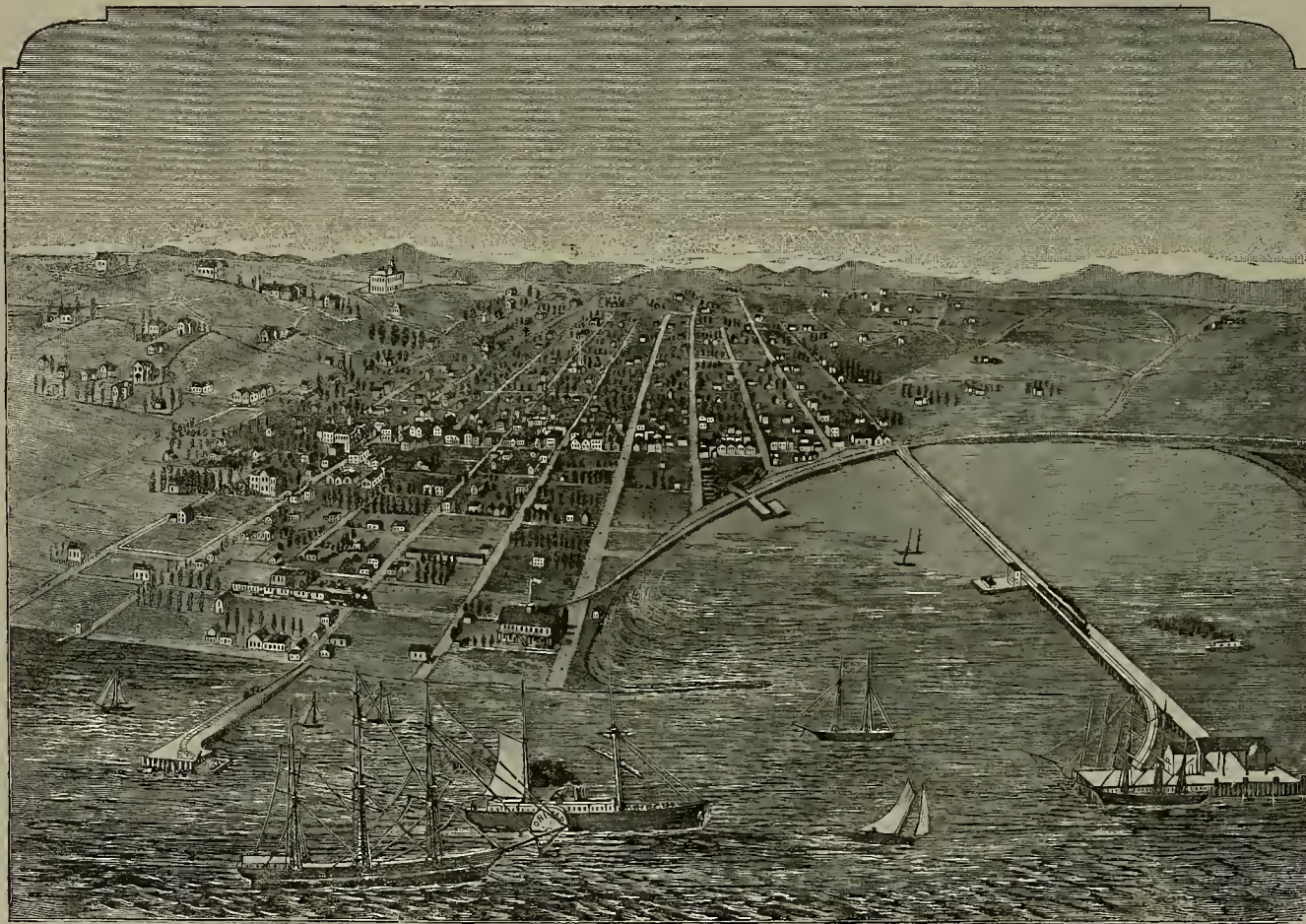
Reduction Works for Arizona.

It has been stated, evidently by persons who had not given the subject proper thought, that in the erection of reduction works in Tucson, a capital ranging from \$15,000 to \$20,000 would be sufficient to cover all possible contingencies. This is a grave mistake, and were it made, it would result disastrously to the enterprise and to the prospects of this city as a mining center. To erect proper works capable of treating all classes of ore in an economic manner, would require the expenditure of no less than \$100,000, and from that sum up to \$250,000, according to the magnitude of the proposed undertaking.

subject and a proper presentation of the matter would probably meet with favorable consideration.—*Arizona Citizen*.

The City of San Diego.

The city of San Diego is beautifully situated upon ground rising gradually from the shore, with just sufficient elevation to furnish good natural drainage, and give the place quite an imposing appearance as it is approached from the sea. The natural advantages of the town for a great commercial emporium could hardly be excelled. The harbor itself is, next to San Francisco, the finest on the coast, while the equable temperature of the climate is superior even to that of the famous bay and harbor of Naples. As the steamer from the north rounds Point Loma, the traveler by sea gets his first view of the city of San Diego, by looking directly across the harbor and over the low intervening peninsula, which separates the harbor from the ocean, and with which it is connected by a very narrow entrance, itself also protected by the high promontory on the left, and the low, receding coast line on the right. The harbor is perfectly land-locked, readily distinguished and easily approached. The view of San Diego, which we present, has just been drawn and engraved by W. W. El-



BIRDSEYE VIEW OF SAN DIEGO, SAN DIEGO HARBOR AND THE OUTLYING COUNTRY.

the different companies, but they are very meager and treat only of the most unimportant work going on in the mines, and where reference is made to interesting points on the lode the information given is so vague as to be rather calculated to deceive than to give any proper understanding of the situation. From information, however, obtained outside of official sources regarding the existence of "concealed bonanzas" we are inclined to the belief that valuable ore bodies have been discovered, which so far have not been officially announced. But as we are restricted by our informants in the use of this information we abstain, for the present at the least, from making any more positive statements than the foregoing.

With reference to the middle and northern mines, viz: all those mines situated between Potosi and Utah inclusive, we have to say that they appear to be in a splendid condition for rapid exploration. There has been an enormous amount of money expended upon these mines in preparatory work, such as sinking shafts and winzes, and making air connections, running lateral drifts, etc., and we have every reason to suppose that the cost of future explorations in these properties will be much less than at any time in the past. In fact, it should be possible to run these mines for the next two years for one third of the expense which the work for the past two years has entailed upon the stockholders. These mines are thoroughly ventilated, and, as a rule, much cooler than they have been for some time past. The danger from water is past, the water problem having been solved, and the work now going on is below the water belt, and the mines are well

Potosi, are all ready for crosscutting on the lower levels, and the fact that in Hale & Norcross there has already been some good ore discovered on the 2600-foot level, gives us reason to expect the uncovering of a body of good ore in this section of the lode.

In the Mexican, Ophir, California, Con. Virginia, Best & Belcher, and Gould & Curry mines there is a block of ground about 1,000 feet in height, by over 1,000 feet in width, and over 3,500 feet in length, which has not, so far as your committee is able to learn, been crosscut or explored in any way to any great extent. What may have been done with the diamond drill and secret drifts in this block of ground, of course, is a sealed book so far as your committee and the general public are concerned.

All the lower levels of the Comstock mines are in an ore zone, as shown by the continual cutting of stringers, seams, and small bodies of rich ore, and there is no reason why there should not be large and rich bodies of ore discovered. In fact, the prospects for the lode were never brighter. So far as the southern group of mines is concerned nothing can be seen below the 1900 level, as the mines have been flooded up to that point for more than a year. Above this level there has been a large amount of ore extracted. Within the past two years over 120,000 tons of ore have been extracted and worked—principally from the Crown Point and Belcher. What this ore paid we have been unable to find out, and we can only say that there is an abundance of ore in these mines, and that it is not the fault of the mines that they have not been placed on a paying basis long ago. In this connection we

The company erecting the works, to insure a full supply of ores, must begin to purchase by sample from the start, and the miners and prospectors on every hand stimulated by the certainty of obtaining ready cash for the product of their mines, will bring in ore in quantities from a hundred pounds to that number of tons, and the money derived from its sale will give them means to further develop, and from that time on renewed activity in mining will be the rule, and, as a sequence, the prosperity of the city.

The company must have funds to purchase all the ore offered for sale, and be in condition, if the supply exceeds the capacity of the works, to store it for future manipulation. A company with small capital cannot do this without crippling itself and meeting many financial embarrassments. For lack of proper appliances the small company could not reduce the ores at the small cost the larger works could. The Grant smelter in Denver works ore at an expense of less than five dollars a ton, and ten dollars pays a big profit. Less complete works could hardly work ten dollar ore at all, and as much of the difference in the cost of reduction is the profit of the miner, it is reasonable to suppose that the cheapest cost of reduction will command a greater quantity of comparatively low grade ores, and the venture would be less experimental as an enterprise.

As Tucson must have reduction works its enterprising people should endeavor to induce such men of wealth as the proprietors of the Argo works at Denver, who can afford to spare millions without any embarrassment whatever. Their attention has already been called to this

liott & Co., lithographers and publishers, 421 Montgomery street, S. F.

COPPER IN MOHAVE COUNTY.—The copper mining interests in Mohave county, says the *Alta Arizona*, are destined, in the near future, to take prominent place. There is probably not a mining district in the county that has not met many ledges bearing copper. A great many of the so-called silver mines in the county are rich in copper, while some of the mines are so rich in this useful mineral that but little attention is paid to the other minerals they carry. The copper interest in this Territory is yet in its infancy, giving an output last year of but 15,500,000 pounds, but the day is not far distant when this yield may be exceeded in Mohave county alone, if one half the ledges that now "show up" well shall prove to be good mines. Some mining men have expressed doubts as to the reward that awaits those who engage in the development of the vast deposits of this mineral in our county. Owners of copper mines need have no fears on this score. Late statistics show that the home consumption alone last year was 40,000 tons—but 140,000 pounds less than the entire product of the country.

THE *Industrial Progress* is a neatly printed monthly published by the Inventors' Institute of this city, which we noticed in the *PRESS* some time since, and is devoted to the sale of inventions on commission. A. Budd Smith, manager.

THE ENGINEER.

De Lesseps and his African Sea.

The African inland sea is still a matter of much thought with M. De Lesseps and his friends. That engineer has lately visited the locality of the proposed connecting canal, and, with a party of engineers, taken a horseback ride over the proposed route, and examined that portion of the country which it is proposed to cover with water. The locality of the proposed "inland sea" is not, as generally supposed, upon the desert of Sahara at all, but quite to the north of it, and separated therefrom by a range of mountains, which form the southern boundary of the Regency of Tunis. The "sea" will occupy the site of several marshy lakes in Southern Tunis, and will cover an area only a trifle larger than the little State of Rhode Island, and not quite so large as the valley near the Gulf of California, which an American Engineer has proposed to convert into a lake for a similar purpose.

One of the principal objects of the enterprise is to give water transportation to the seaboard for the timber from the mountains upon its southern and western border. It is thought, moreover, that the moisture which will be engendered by the presence of this body of water will bring into cultivation a vast tract of land, which, although now a desert, was quite celebrated for its fertility during the Carthaginian rule in Africa. The canal will start from a point near the port of Gabes. Exclusive rights over the land and the forests surrounding the "sea" will compensate the company which undertakes to excavate the connecting channel. A preliminary survey has been completed by Commandant Roudaire, and there is no doubt that the level of the lakes is fourteen meters lower than that of the Mediterranean. The chief question now requiring elucidation is the nature of the soil between Gabes and the lakes. If it turns out to be anything but rock, M. de Lesseps thinks there will be no difficulty in speedily carrying out the project, which has occupied his attention ever since it was suggested to him by the Empress of the French at the opening of the Suez canal. Sahara, however, will still remain as much a desert as it ever has been since the commencement of the historic period of time.

THE GREAT STATUE OF LIBERTY.—A singular problem in engineering is presented to the committee which has in charge the construction of the pedestal for the great statue of Liberty in New York harbor. The statue weighs, complete, only about eighty tons, but presents an immense surface to the wind, and stands, moreover, on a comparatively small base. Considering that it is not extremely easy to construct a brick chimney of the same height—one hundred and forty-eight feet—weighing ten times as much, of pyramidal form, and standing on the ground, so as to resist the force of a storm, the difficulty of raising and securing the statue, not on the ground, but on the top of a pedestal nearly one hundred and fifty feet high, is apparent. There are no precedents for anything of the kind, and it will hardly do to secure the figure by the rope stays, like those of a derick, which the incapable engineer would naturally resort to. The members of the committee seem to have perceived something of the difficulty of the undertaking, and have telegraphed to France for instructions as to the mode of doing the work. The *American Architect* suggests, that the plan said to be employed by the Japanese for securing their light pagoda towers against the effects of wind, by means of a long weight or pendulum, hung from the top of the tower, and reaching nearly to the floor, might perhaps be employed with very good effect for the New York statue. A very similar device, applied by Sir Christopher Wren, has for two hundred years held up the spire of Salisbury Cathedral, as well as those of one or two other English churches, in which a heavy wooden framework, extending as far downward as the construction of the tower permits, is suspended by strong iron bars from the capstone, free to swing in any direction. The effort of the wind on one side of the spire inclines it until the hanging framework rests against the opposite side, but when the pressure is relieved, the pendulum swings back, bringing the stonework with it into its original place.

THE BROADWAY, N. Y., TUNNEL IMPRACTICABLE.—There is no use in sighing for the unattainable; and if it is a fact that the obstacles to the construction of a tunnel under Broadway are too great to be surmounted, the public must reconcile itself to disappointment on that score. That the project is impracticable, at least upon any plan thus far proposed, is the conclusion at which the commissioners appointed by the Supreme Court to investigate the subject have arrived. The chief difficulties named by them are the interruption of traffic during the two or three years which it is estimated the work would occupy, and the damage to which the foundations of buildings would be liable from the necessary excavation of the street. It is not held that the accomplishment of the work is absolutely beyond the reach of engineering science in its present state, provided sufficient time and money are at command; but the commissioners are not of the opinion that the scheme in its present shape is feasible, and they also doubt whether the tunnel road, even if completed, would supply the needs which it is intended to meet.

USEFUL INFORMATION.

IMPROVED FOOT WARMERS.—M. Anceelin, a French experimentalist and the discoverer of heating with crystalline acetate of soda, has demonstrated the much slower cooling of foot warmers containing that substance than that of the ordinary ones with water. Two leading French lines of railway have this system in general use, and in England the London and North-western railway, which had last year 3000 of such warmers in service, has this year 6000. Applications of the system have also been made in Italy, Spain and Portugal; and it is pointed out that among other applications of the same principle are the heaters for beds, dishes, pontics, muffs and feeding bottles. But Mr. Anceelin, in an article contributed to *La Nature*, remarks that the operation of filling the warmers requires certain precautions to avoid suffusion or supersaturation, which the acetate is liable to in a closed vessel. This phenomenon is apt to occur, especially if there is an excess of water in the acetate—a fact due often to the moisture in the air, which the substance readily absorbs. The precautions consist mainly in elimination or saturation of this excess of water, and also in the employment in the warmer of a spherical reservoir of crystals, with thick walls of a material which conducts heat badly. This reservoir also acts in destroying supersaturation by the vibration it imparts to the liquid salt during the train's motion.

IMPROVEMENTS IN MAKING GLASS.—The high expectations in regard to toughened glass can scarcely be said to have been realized as yet, and several improvements must yet be made before the process can be considered as perfect. The original method consisted in immersing the article while still red hot in a bath of oil heated to 200 degrees C. (392 degrees Fahr.), and letting it remain there until it had cooled down to that temperature.

T. Lubisch claims to have discovered a better method of hardening glass, or, rather, an improvement on the same process. He also immerses the article while red hot into a hot bath, but he takes it out again when it has nearly lost its redness, and lets it cool very slowly in an oven that is heated nearly to the temperature of the glass. As the bath does not need to be much above 212 degrees Fahr., he prefers to use solutions of the carbohydrates in water (starch, gum, or the like.) Such a bath does not soil the surface of the glass, as is the case with fats, oil, and bituminous substances.

Glasses subjected to this operation resist pressure and shock just as well as those hardened in oil, but possess this advantage, that they can be cut with a diamond, or polished and cut with sandstones. While the oil method only permits of the hardening of articles of simple shape, by Lubisch's process all glass things can be hardened—as, for example, all bottles, mugs with handles, pitchers and other vessels.

NEW TEST FOR WASTE PIPES.—A Boston paper relates a discovery which may prove to be a better test for leaky waste pipes than heretofore used. The invention is accorded to a woman. Noticing an offensive odor in the parlor, she suspected a defect in the waste pipes, and sent to the agent to request that a plumber might be sent to examine them. The agent was incredulous, and refused. She tried the peppermint test. To make her proofs more convincing, the woman, after borrowing two cats from her friends, purchased some oil of valerian, and stationing the animals in the parlor, went up stairs and poured the valerian into the basin in the same way that the peppermint had been applied, and then descended to watch the result. Cats are extremely fond of the odor of valerian, and it was not long before both of them began to sniff the air, and move toward the door of a closet through which the waste pipe ran. The door was opened for them, and they immediately sprang upon a certain shelf, where they remained purring with satisfaction. A third time the woman went to the agent, who, though still unbelieving, consented to send a plumber to make further investigations, and, on cutting away the plastering so as to expose the pipe, a joint was found completely separated at the place where the cats had indicated.

MORE NEW USES FOR COTTON.—It is said it has been demonstrated that fire and water-proof houses can be built out of cotton and straw. The cotton used is the refuse of the plantations and factories, and when ground up with about an equal amount of straw and asbestos, is converted into a paste, and subsequently into large slabs or bricks, which becomes as hard as stone. The article thus made is pronounced the best of architectural material, and will be much used. A Boston rope maker of long experience, like the father before him, says that cotton rope can be made for fifty per cent. less than hemp, and is preferable for all shipping uses, cables, bolt, rope halyards, tow ropes, hawser, tackle and falls, hoisting, etc. He also says that cotton is superior to hemp for caulking, and believes that it can be used for roofing and as a substitute for leather and rubber in hose and belting, and for tubing to inclose telegraph and telephone wires, both over head and under ground. He states that 150 tons of hemp rope is made in the United States daily, the material for which is mostly imported. Congress has authorized the Secretary of the Navy to intro-

duce cotton cordage into the naval service of the United States, to such an extent as will fully test its value and efficiency, as compared with the kinds now in use.—*Industrial South.*

ASBESTOS ROPE.—Asbestos rope is described among other articles now being turned out by the United Asbestos Co. of Great Britain. The strength seemed to be about one fourth that of ordinary hemp rope of the same diameter. Rope one and one half inches in diameter is stated to have a breaking strength of one ton, and twenty feet of it weighs thirteen and one fourth pounds. It is made especially for fire-escape purposes, for theatres, fire-brigades, and for ready means of escape from houses and public buildings; its advantage being that it will not break and drop its burden if a flame bears upon it. It is made like ordinary rope, but spun from Italian asbestos thread, and there seems to be every probability of its favorable reception by the public.

TO DEODORIZE KITCHEN ARTICLES, cover them with charcoal dust, place them in an enclosed vessel, and raise the temperature to 94 F.; let it remain thus for several hours; remove and clean the articles from the dust, and they will be found, says a contemporary, free from all odor.

LUMINOUS PAINT is now used to illuminate the faces of clocks, watches and door plates. It may easily be made as it consists merely of a compound of lime, sulphur and varnish.

GOOD HEALTH.

Arsenic for the Complexion.

Speaking of the weakness of the gentler sex, says a Cleveland correspondent, I met my friend, the doctor, yesterday, and as he and I stood and surveyed the passing show, a plump, fair woman passed by, and I said to him, "What a charming complexion!" "Short lived, though, my dear boy," quoth he. I expressed surprise, for my charmer was young. "Arsenic, Talbot, arsenic!" said he calmly. Then it dawned upon me what he meant. Resuming, he said: "Its use is increasing. Women eat it in two forms: the white powder, that caused poor Jennie Cramer's death, or arsenious acid, as the drug dealers have it, and Fowler's solution, which the pharmacopoeia says is a mixture of arsenic with potash in the fluid form. Either way of taking arsenic produces the plumpness of face and beauty of complexion that you noticed in your fair lady. Its influence is principally on the capillary system of the skin, which produces the plumpness. In plain English, water is the influence at work, and in the end it shows itself. The skin assumes a watery transparency, which in its turn gives way to ghostliness and whitening of the lips. This is the awakening from a blissful dream. Beauty vanishes and the end comes. Horrible? Oh, no! I call it retribution. Cynical? Perhaps! but plain truth generally is, my dear boy, in these days of ours. Arsenic eating can be stopped at any time without an effort, except that which vanity dreads. It has none of the soporific effect of opium or morphine. Used as a medicine, it is an excellent tonic, one of the best known."

"How long can arsenic be used before it produces the ghostliness you speak of?" I asked my mentor.

"Six weeks' unbroken dosing will do the work well and effectually," answered he; "but woman is skillful, and using it a week she pauses, and before the effect of the cessation comes she takes another interval of arsenic dosing. This fate is held off. The end must come, however, and it comes all too soon for the arsenic eaters. Some systems agree with the drug longer than others, but a few years of the periodical eating settles it."

You Cannot Kill a Pig with Arsenic.

"It is an astonishing thing," went on the cynic, "that you cannot kill a pig with arsenic. I had a friend who was an enthusiastic chemist. He had preserved a lot of cherries in an arsenical solution, and having no further use for them threw them one morning from his laboratory window. A rambling porker, on the lookout for edible trifles, saw them drop, and looking them over and contrasting them with the usual expanse of tile, brickbat and old tin cans on which it had been his daily wont to browse, eagerly swallowed them. My friend was alarmed, and visions of a bill for the value of a dead and uncatchable pig rose like a spectre before his eyes. He chased the pig away, and thought perhaps its death might not be laid at his door if the pig was not there when it expired. The incident warned him; but on the following morning he was dumfounded to see the pig waiting for more of the deadly fruit. Some were prepared, for my friend was an investigator, and doled out to his hogship. He devoured them, and grunted a muffled paean in their praise. Each morning that pig returned, and each morning the dose was increased until my friend was ruined and the pig's confidence in arsenical cherries stronger than ever."

SLATES BAD FOR THE EYES.—Professor H. Cohn, of Breslau, believes that the use of slates by school children tends to produce short sightedness; and would substitute either pen and ink or an artificial white slate with black pencil, manufactured in Pilsen, and al-

ready introduced into a few German schools. In 1878 Horner found that B and E could be read, if black on white ground, 496 cm.; if white on black, 421 cm.; and if gray on black, 330 cm.; and ascribed the greater difficulty with white letters to irradiation. The reflection of light from the surface of slates is, it is said, enough alone to cause their disuse. The school board of Zurich has forbidden the use of the slate after the first term (primary year), and many teachers and oculists advocate the substitution of white-boards for blackboards. The noise of slates: dirty habits formed by erasures; bad positions favored by reading the less legible script; a heavy hand; and the habit of twisting, learned with a pencil, and to be unlearned with a pen—these, it is said, are obviated by the use of pen and ink at the outset. The obvious objections are, that children can occupy themselves better with slates, and from pencil to pen is from the easier to the harder.

Scientific Nursing.

There is no subject of so much general interest as this, concerning which there is, at the same time, such a widely prevalent ignorance. There are few, especially among women, upon whom will not devolve, at some time in their lives, the care of the sick; fewer still, who will not at some time become dependent upon such care; and it might naturally be supposed that matters of such primary and universal importance as sanitary conditions and the practical application in the sick room of scientific principles would be too familiar to every one to need to be further enlarged upon. But the fact is, it too frequently happens that all the scientific knowledge which ever enters the sick room comes in with the doctor and goes out again with him. This state of things requires to be improved. Knowledge, and that correct knowledge we call science, is just as indispensable to the nurse as to anybody else.

It is a great mistake to suppose that all women—even good women—make good nurses. The best intuition and the tenderest heart may co-exist with an utter lack of executive ability, and be more than counterbalanced by ignorance and prejudice. Native aptitude gives advantage, but it cannot be relied upon alone. Even those who possess in the highest degree the natural gift of ministrations which renders them so acceptable to the invalid, would find their power of usefulness very largely increased by a familiarity with what may be properly called the science of the sick room. Physicians are recognizing more and more the importance of hygienic agencies in the treatment of disease, and with this there has come an increasingly urgent call for the scientific instruction and practical training of those who are to take charge of invalids. Science explains the conditions upon which the art of the nurse depends, and lays down principles which can not be violated without injury; but it is not at all necessary to make a parade of technical language in stating its requirements. *Popular Science Monthly.*

How to Feed Babies.

Dr. H. Gibbons, Jr., gave an interesting lecture at Cooper College last week on baby food, taking the ground that the system of nursing by artificial food was very destructive to children's health. He claimed that in San Francisco one death in every 300 was attributable to improper diet, and one in every 200 in New York. Taking the average, 250, for the United States, he said we have 200,000 infants whose deaths are the result of improper food. For natural food no substitute has yet been found, unless it be cow's milk, which, though not of course as good, answers the purpose. Wet nurses, he thought, were better than cow's milk. The statistics showed that of 100 children nursed by their mothers eighteen per cent. had died, while of 100 nursed by wet nurses twenty-nine per cent. had died in the first year.

A striking example of the fallacy of the artificial food theory, he said, was furnished by a London hospital. Nineteen per cent. of those cared for by wet nurses had died, while of those nursed by artificial food fifty-four per cent. had died. Of one hundred children nursed by their mothers sixty-three were healthy, twenty-three tolerably so, and fourteen sickly. Of those half nursed fifty-two were healthy, sixteen tolerably so and thirty-two sickly, while of one hundred children fed on artificial food, ten were healthy, twenty-six tolerably so and sixty-four sickly. A practice injurious to a child's health is, he said, that of nursing immediately after birth; another, that of nursing at night, as a child's stomach, as well as an adult's, needed rest. If the milk was insufficient, he said, other food might be added, as this was better than frequent nursing and overloading the stomach. He recommended fasting during illness, instead of constant feeding, and advised the giving of a drink of barley water before nursing, especially in hot weather.

BLOOD INJECTION IN SURGERY. Dr. Labbe recently removed a wen weighing eight pounds from the neck of a young woman. He then injected one pound of blood, taken from the arm of a medical student into her veins, and so saved her life. The student is to be fed on the best of the food till he makes up for his loss—a matter of a few days.



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TABLE OF CONTENTS.

EDITORIALS.—Columbian Mines; Hydro-Carbon Blowpipe and Assay Furnace; Diving for Gold, 265; Passing Events; The Center Core System of Tunneling; New Form of Balance-Bob; English Investments in the Pacific Coast Mines—No. 2, 272. Mine Timbering—No. 8; Notes from Eureka, Nev., 273. Patents and Inventions; Notices of Recent Patents, 284.

ILLUSTRATIONS.—Assayers' Portable Muffle Furnace; Blowpipe and Crucible Furnace for Assayers and Miners, 265. Bird's-Eye View of San Diego, San Diego Harbor and the Outlying Country, 270. Differential Methods of Framing Mine Timbers, 273.

CORRESPONDENCE.—Early History of the Comstock—No. 4; Fresno County Mines, 263.

MECHANICAL PROGRESS.—Explosions Made by the Squeezor; The Working of Soft Steel; A New Elevator Brake; A New Tool; Indurated Ware; Saw Manufacture in Paris; Steel Forging; Expansion and Contraction of Iron Wire, 267.

SCIENTIFIC PROGRESS.—Influence of Metals on the Oxidation of Oils; Theory of Magnetism; The Sense of Direction in Animals; Constitution of the Sun; A New Secondary Battery; God in Nature; Origin of Thunder Storms; Leaf Water, 267.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends and Bullion Shipments, 263.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico and Utah, 263-9.

THE ENGINEER.—De Lesseps and his African Sea; The Great Statue of Liberty; The Broadway (New York) Tunnel Impracticable, 271.

USEFUL INFORMATION.—Improved Foot Warmers; Improvements in Making Glass; New Test for Waste Pipes; More New Uses for Cotton; Asbestos Rope, 271.

GOOD HEALTH.—Arsenic for the Complexion; Slates Bad for the Eyes; Scientific Nursing; How to Feed Babies; Blood Injection in Surgery, 271.

MISCELLANEOUS.—Coal for Arizona; Good News for Miners; Indian Question, 2-6. The Prospects of the Comstock Lode; Reduction Works for Arizona; The City of San Diego, 270.

NEWS IN BRIEF.—On page 284 and other pages.

BUSINESS ANNOUNCEMENTS.

Powder—Excelsior Powder Company, S. F.
Rock Drill—J. Cuyas, New York, N. Y.
Assessment Notice—Seaton Gold Mining Company, S. F.

Passing Events.

The rains have come again this week and are welcome to the country. The water season this year will be comparatively short no doubt, and all the rain that falls is so much gained.

Spring has fairly opened, and the prospectors are now all over the hills. In the southern counties particularly is this the case. Still, further north prospecting has begun. Up at Wood river the spring is six weeks in advance of the season. Relocating has placed many good prospects in industrious hands.

The only strike of consequence of late has been at Tuscarora, Nev. In the mine where the strike was made a short time ago an ore seam was discovered on the surface that led to the conclusion that an extensive ore body existed deeper down. In order to determine this fact a drift was projected in the direction of the surface indications. This level had reached a distance of forty or forty-five feet when the ore body was encountered, following a hanging wall. A crosscut was immediately started to determine the width of the ore body. The crosscut is in six feet, and no wall is reached yet. The ledge is widening rapidly, and gives promise of being the heaviest ore body ever discovered in this district. The entire gangue, as far as opened, gives an average assay of \$300 per ton. A chloride seam of twelve inches, following the footwall, gives a return of \$853.50 per ton.

The Center Core System of Tunneling.

The early tunnels of modern times were all built for canals, and railroad construction did not commence until between 1825 and 1830. The canal tunnels of the last century were, with few exceptions, narrow ones; but about the beginning of this century tunnels of a wider cross section began to be driven. Moreover, the earlier English canals were through rock. The Tronquoy tunnel in France, on the St. Quentin canal, built in 1803, seems to be the first in which a system of timbering and arching for supporting soft and loose ground had to be devised for a wide tunnel—twenty-six feet. On starting this tunnel, we are told by Mr. Drinker, in his work on "tunneling," that the engineers adopted a system of construction which was, in fact, simply an extension of the old small heading timbering in loose ground, with caps and legs. In the plan adopted a heading was driven, and the foundations for the abutments laid in it; then a second heading, and above it another, the masonry being successively carried up in each.

After these three sections as they may be called, had been successively erected, the top was excavated across and connection effected between the two sides. In the top the arch was complete. No centers were used, the arch being built on a mound of well rammed earth. Finally, after the completion of the arch, the center core was removed.

This was the origin of the center core system, and so far as the center core alone is concerned the system should be called French, as it originated in a French tunnel. It is called, however, the German or center core system. The Germans adopted and used in their early tunnels the center core system in full, building their abutments first (as was done at Tronquoy) and arch afterwards, hence the distinctive term "German" is applied to this plan of work.

The French engineers, however, have later inclined to a system what is a sort of middle course between the Belgian and center core system, and which, no less an authority than Mr. Henry S. Drinker says, embodies the worst features of both.

This primitive system of construction was improved on at the St. Aignan tunnel in 1822. A heading nine feet high was driven at the top of tunnel; then steps were dug down on either side, a core being left in the middle. The abutments were put in, the arch turned, and the center core taken out. In 1824, a further improvement was made in the Pouilly tunnel. Two adits were driven on either side of the tunnel, and on these the foundations and abutments were made. Then a top-heading was driven and enlarged. In this space the arch is turned, and finally the core taken out. The system, with a slight change, was adopted in the Ronbary tunnel in 1828. During the third, and beginning of the fourth decades of this century, railroads had hardly been introduced in Germany. In 1837, however, in the construction of the Oheron and Konigsdorf tunnels, there began to be a difference of opinion as to the system in use, and at the Konigsdorf tunnel, the German system proper may be said to have been inaugurated. Here two bottom headings were first driven, and on them the foundations were laid; and at certain distances these headings were connected by crosscuts; and through these crosscuts, segments of the invert were built. Then a top heading was driven, which was widened out, and the arch turned. Finally, the center core was removed, and the segments of the invert previously put in the crosscuts were connected. The successful completion of the tunnel gave a reputation to the German system, which subsequent events did not justify.

The leading feature of the system is the employment of the center core. It is claimed by the advocates of the center core system that, first, in hard ground it gives cheap working, as the core is readily removed by the front, two sides and top blasting surfaces presented, which will give four open faces, and, with cross-cuts, five; second, that on soft ground exerting pressure as the openings are small, there is not as much danger as in other systems where large faces are presented; third, that the use of a standing core serving as a temporary support to the roof props, saves much timber. There are many defects, however, in the system, which have caused its abandonment even in Germany in late tunnels.

Tucson, Arizona, is filled with miners and prospectors, who have been driven in by the proximity of the hostile Indians.

New Form of Balance-Bob.

The term "balance-bob" is generally applied to an assemblage of parts of a trussed-frame or lever, used in mining operations for the purpose of storing energy by the raising of a certain weight during one part of an engine stroke, so that it may be given out during the other part of the stroke and thus equalize in part or whole the two strokes of the engine; or, when the pump rods balance each other, as in the double rod system, it may be used to support a part of the weight of the pump rod at intervals so that their weight will not be increased beyond their tenacity or a safe working limit.

These balance-bobs have heretofore had the nose fitted with a pin projecting from the cast iron portion, and the side rods have been attached to this pin so that any severe or unequal strain would be brought directly upon the cast iron, and would tend to rupture it.

Wm. R. Eckart, the well known mechanical engineer of this city, who is probably the best posted man on this coast in mining machinery, has just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, an improved construction of balance-bobs, in which the side rods at the bob-nose are connected directly with the end of the wrought iron tension braces of the bob, so that the stress of the side rods is transmitted directly to the weight box of the bob without submitting any of the cast portion to tensile or transverse strains. The lower ends of the side rods are connected with the pump-rod saddle plate by equalizing levers, so that any variation in the distance between the end pins of either side rod will not produce unequal strain upon the rods or other parts.

The horizontal beam and king-post of the bob may be wood or cast iron. These are secured to a central casting, which forms or carries the trunnions. Struts, usually of wood, extend from the top of the king-post to the ends of the horizontal beams, and wrought iron straps or tension braces extend from the bob-nose over the top of the king-post, so as to sustain the strain of the weight.

The straps are secured to the beams by means of bolts or ties, or any of the well known ways. Pins pass through the ends of these braces, and the side rods are fitted to the projecting ends of the pins. If these rods are in pairs, or if they are single, the ends of the braces are forked, and the pin extends across the fork. The side rods extend down alongside the pump rod, and are connected with opposite ends of the equalizing bars, which extend across upon each side of the pump rod beneath the saddle plates. This connection of the side rods and the equalizing levers may be made by means of cross levers, to the centers of which the side rods are connected. The ends of these cross levers are connected with the ends of the equalizing levers. The saddle plates extend some distance along the wooden pump rod, and are strongly clamped to it by bolts, which pass through holes in the plates just outside the pump rod.

This gives a firm connection without the necessity of weakening the pump rod by any holes or cuts. The enormous weight that must be sustained by the pump rods sometimes causes the saddle plates to slip unequally, or the boxes or pins at the bob-nose to wear unequally, when the whole strain would be thrown on one side or the other if the side rods were rigidly secured to the saddle plates, and breakages would occur. This difficulty is overcome by the use of the equalizing levers.

EXTRA EDITION.—We had intended to publish an edition of twenty-four pages this week, but some unavoidable delay in the engraving department has compelled us to defer it until next week. We shall then issue a double edition, devoted more especially to Arizona and its mines.

THE Silver State has entered on its twenty-second volume. This journal, though small in size, should be an example to many others, from the way it collects the mining news of the various districts in its locality. There is always something of interest to be found in its columns, and it presents very fair and terse statements about local mines. The mining interests of any region are always assisted materially by such publications.

ELEVEN miles north of La Porte, an Illinois company last year worked by machinery to a depth of 300 feet, under the superintendency of J. Lilly. The parties must have met with success, for they have started a tunnel, and are working it day and night. The tunnel is to be about 1,400 feet long. The company owns several gold mines in California, and numerous coal mines in Illinois.

English Investments in the Pacific Coast Mines—No. 2.

Prepared for the MINING AND SCIENTIFIC PRESS by H. DEGRUIT.

The Emma Fiasco—Early History of the Mine.

The next of these Anglo-American investments, taking them in the order of their occurrence, consists of the Emma purchase, a transaction that, because of its magnitude and the alleged unfair means by which it was consummated, has caused no little scandal on both sides of the Atlantic. This mine, which is situated in Little Cottonwood canyon, Utah Territory, was located in 1868, by two prospectors named Woodman and Chisholm. Being without means to do the necessary work upon it, they afterwards disposed of a one third interest in their location to James E. Lyon, who thereupon advanced them enough money for that purpose. During that and the following year, a fair prospect was developed, and about 100 tons of good ore were extracted from the mine. Being impressed with the idea that the property might prove valuable, Woodman and Chisholm sought to oust their partner by relocating the claim, under the pretext that the lode ran in a direction different from that described in the original location, taking advantage of Lyon's absence from the country to carry out their scheme, he having meantime left on a visit to New York. Returning and finding how he had been served, Lyon brought suit, and recovered the one third interest that had been so wrongfully wrested from him; William M. Stewart, then United States Senator from Nevada, being his leading counsel. This accounts for Stewart's connection with the early history of the mine.

Treasurer W. Park Appears upon the Scene.

While in New York, Lyon had in some manner become acquainted with Treasurer W. Park, formerly and for a long time a resident of San Francisco, to whom he made such representations concerning the Emma claim, as induced that gentleman, accompanied by General Baxter, to come out to Utah in the month of March, 1871, and make an examination of the property, with which he was so well pleased that he induced the owners to transfer it to him, with a view of disposing of it on the London market. Under this arrangement the owners got but little cash down, but were to receive a considerable sum contingent on a sale of the mine being effected. Having got possession of the mine, Mr. Park, who had the entire business in his own hands, proceeded to organize the "Emma Silver Mining Company of New York," giving out that large bodies of valuable ore had been developed in the mine and that a great deal of money had already been expended upon it, both of which statements were in a good part true.

Whether or not Mr. Park in these preliminary stages of the business, or at any time thereafter, was more or less honest than the average promoter of these speculative schemes, certain it is he had already earned the reputation of being an astute lawyer as well as a shrewd and successful financier. Bred to the bar in the State of Vermont, he came thence to the Pacific coast at an early day, bringing with him those frugal and thrifty habits for which the natives of the Green Mountain State are apt to be noted. He had, moreover, become somewhat conversant with mining affairs through his connection with various enterprises of that kind, having also held for a number of years the position of "Receiver" for the celebrated Fremont estate, in Mariposa county. While discharging the functions pertaining to that position, Mr. Park so completely absorbed the resources of the property as to gain for him among the creditors of the bankrupt concern the appellation of the "Great Exhausting Receiver."

However much Mr. Park may have overestimated or exaggerated the importance of the Emma mine in the spring of 1871, there is no denying that a great deal of work had previously been done upon the property, which at that time presented a very promising appearance. Before going to England Mr. Park had the mine examined and reported upon by Professor Silliman, who for this service received, it is said, the sum of \$5,000, with the promise of a much larger amount in case the property was sold. That Prof. Silliman's report was favorable it is needless to say—that it was extravagantly so is a point open to some question.

Hunting for Capital on English Preserves

Having engineered matters up to the point above designated, Mr. Park, accompanied by Senator Stewart, leaving New York in the summer of 1871, crossed over to London. Arrived in the great metropolis, our adventurer, armed with Prof. Silliman's report, backed as it was by good accounts constantly coming forward from the mine, experienced little trouble in getting the ear of the English investing public, and that he took care to facilitate by first securing the good offices of certain influential personages and promoters of speculative schemes, by interesting them in his project.

Among the most conspicuous of the parties so subsidized, was one Albert Grant, who, for services to be rendered, was promised a fee of £100,000, payment being made contingent on the successful floating of the property. This Albert Grant, known also as Baron Grant, he

having bought the title somewhere abroad, and, not being a member of the regular British peerage, had made himself notorious by originating and successfully carrying out in London, Paris, and elsewhere on the Continent, a number of schemes distinguished for their magnitude and boldness, some of them being as disreputable as bold; but having made money, and thus condoned his offenses, Mr. Park considered him a proper person to help carry out his plans, despite his former questionable methods and unsavory fame. Baron Grant, though his career was afterwards brought to a disastrous and ignominious close, was, at the time of Mr. Park's advent in London, living in that city in great style, a power on the stock exchange, and a magnate in the financial world. He was at the head of railway enterprises and other important movements, few men having greater influence in moneyed circles than he. For the furtherance of Mr. Park's purposes, this Baron was therefore a very available person. Gen. Robert C. Schenck, then American Minister at the Court of St. James, was persuaded to buy some of the shares of the company proposed to be organized, and of which he was afterwards made one of the Directors. Gen. Schenck always maintained that he bought these shares, 500 in number, with his own money, and in good faith, and that they were not donated to him by Mr. Park, as many supposed.

Besides Baron Grant, other London dignitaries and people of high position were induced to take a little stock in this new venture, Mr. Park, it is surmised, having placed a few shares where he supposed "they would do the most good." With this progress made,

The Emma Silver Mining Company (Limited)

Was organized in London, and its prospectus issued on the 9th day of November, 1871. The capital stock of the company was fixed at £1,000,000, divided into 50,000 shares of the par value of £20 per share. Of these shares one half was offered to be subscribed for by the public, the vendors of the mine retaining the other half. The property was taken on the report of Prof. Silliman, and such other sources of information as the purchasers considered reliable, they having failed to first procure any report to be made upon it by their own agents or experts, a very unwise course of procedure, certainly. Prof. Silliman, besides other favorable statements, represented that there were in the spring of 1871, when he made his report, 32,000 tons of good ore in sight in the mine, while between that date and the time when the property was sold the English investors were given to understand that such developments had been made as largely increased its value. They were assured that not less than £46,000 of net profits had accrued in the interim, aside from 2,800 tons of first-class ore, of the estimated value of £70,000, that had been shipped to England, and 8,000 tons of second-class ore, of the estimated value of £64,000, piled up at the mouth of the mine, which latter still contained reserves larger than represented by Prof. Silliman, with much more of similar import.

Thus the advertised shares offered the public were soon subscribed for, and the purchase money paid over to the vendors by the trustees appointed to receive and hold it till the property had been duly transferred to the company. This done, the transaction was consummated to the satisfaction of all parties concerned—both the buyers and the sellers congratulating themselves on having made a good bargain.

In Bonanza for a Year.

Starting out under auspices so favorable, the new enterprise prospered for a time beyond expectation. The mine turned out bullion freely and the profits were large, admitting of greater dividends being paid than had been counted upon. Within four months from the time the company came into possession of the property their shares had advanced from twenty to twenty-three pounds sterling, at which figure they were in such demand on the London market that the Board of Directors, the shareholders concurring, bought from the vendors the 25,000 shares which they had retained, paying the full market price for the same.

Meantime, some ugly rumors having gotten abroad in regard to the outlook of the mine, the company decided to send out an agent to inspect and report on the same. Mr. E. Brydges Williams, member of Parliament for London and one of the Board of Directors, having been selected as a suitable person to perform that service. As the result of Mr. Williams' mission, the faith of the shareholders in the mine was fully re-established, that gentleman having found it all and even more than the vendors had represented it to be, and even going so far as to venture the opinion that the property was honestly worth twice as much as the company had paid for it. This was in the early part of April, 1872. Late in the fall of that year Mr. George Anderson, also a member of Parliament for London and a Director of the company, paid the Emma mine a visit, and after a careful examination endorsed all that Mr. Williams and Prof. Silliman had said of it, paying at the same time a high tribute to the integrity and dis-

interestedness of Messrs. Park and Stewart.

Disappointment, Disaster, and Final Collapse.

During the first year of its existence, the Emma company disbursed to the shareholders the sum of \$195,000, paying monthly dividends, the last of which, six shillings per share, was paid on the second day of December, 1872. Presumably these dividends were paid from the net earnings of the mine, though there is a suspicion that Mr. Park, being desirous of sustaining the market, advanced the money to pay the last two made. Be that as it may, the company at the end of 1872 found themselves confronted by the astounding discovery that their stock of available ore was exhausted, everything in sight worth taking out having been extracted without any new ore bodies having been developed or much advanced exploration done in the mine. Prof. Silliman's 32,000 tons in sight had shrunk to 11,420 tons, the quantity raised during the year. About the quantity shipped to England, there had occurred such mistake that the 2,800 tons reported in the company's prospectus had, in like manner, shrunk to 1,800 tons; Mr. Park, unable to account for the discrepancy, having, at a cost of £28,000, made up the same out of his own pocket. The quantity of ore reported afloat also turned out strangely deficient. Shrinkage and collapse occurred everywhere, causing the expected next annual yield of the mine to dwindle from £700,000 to the insignificant sum above mentioned.

The company unable to weather the crises so precipitated in the condition of their affairs, a collapse ensued. The mine was shut down and the working force dismissed. Dividends were "declared" off. The shares of the company from twenty-three pounds dropped speedily to one tenth that amount and finally to zero, being no longer quoted on the Stock Exchange. Everybody was disappointed and everybody disgusted. Inquiry into the causes of these disasters being now in order, it was ascertained that the mine, prior to its being visited by Messrs. Williams and Anderson, had been "doctored" in the most outrageous manner, the process of fixing it up consisting in the exposed parts being cemented with rich ore, the work having been done so adroitly as to defy detection. To accept this, the theory of those gen-

condition to which it had been reduced through long neglect, the excavated ground caved in and the plant destroyed, having been several years since carried away by a snow slide, the work of rehabilitation has proceeded rather slowly. Nevertheless, much has been accomplished, both in the direction of restoring as well as further exploiting the property, which at the present time presents a very encouraging appearance. Although experts have heretofore been divided in their opinions as to the merits and future prospects of the mine, few who have had opportunities for forming a correct judgment on that point entertain now any doubt but what valuable ore bodies will at no great depth below present workings be developed, and the company be brought into bonanza once more. This is the belief of all the resident miners, confirmed by the opinion of Prof. J. H. Morton, of Salt Lake city, who, besides being familiar with the history of the mine, is thoroughly conversant with the ores, the formations and the vein system of the district, where he has spent much time examining and reporting on properties, projecting and supervising improvements and in the discharge of such other duties as pertain to the position of a first-class mining engineer. Being an educated geologist as well as an experienced practical miner, Prof. Morton's opinion should perhaps, in this particular case, be considered worth more than those of all the other experts who have expressed their views on the prospects of the Emma mine combined. That subsequent developments may make good the favorable opinions of Prof. Morton is the fervent desire of many who have no other interest in such result than seeing these English investors, who, as a body, have acted honorably throughout this business, saved from ultimate loss.

INVENTION FOR PROSPECTORS.—F. B. BROWN, of Denver, has invented an electric apparatus for detecting and locating minerals, which is said to be a wonderful instrument and a marvel of science. It is a small electrical machine, with small points at the ends of the positive and negative wires. These points being held near together and moved over a piece of mineralized rock give a constant succession of sparks when passed over mineral of any kind, but a barren

Notes from Eureka, Nevada.

[From Our Regular Correspondent.]

EDITORS PRESS:—The tributers are taking a great deal of ore out of the Jackson mine, and, to facilitate this work, the company will cut out a new station in the shaft, between the third and fourth levels, which are 160 feet apart. A new drift will also be run from this station, by which it is thought that the continuation of the old ore bodies between the third and fourth levels will be found.

At the Albion Mine.

Three or four new prospect drifts have been started. The work is being done on contract. Several men are at work in the old chambers taking out ore. When a sufficient quantity is extracted to justify it, the furnaces will be started up. It is thought that they can be run successfully, notwithstanding past difficulties. At any rate, it will be cheaper to smelt the Albion ore at the company's furnaces at present, than to haul it to any other, as there is a large amount of charcoal and general supplies on hand. To haul these to any other furnace would be very expensive, added to which there is a large supply of charcoal, which it would be necessary to resack. The shrinkage on the charcoal would probably be twenty per cent., a loss of itself amounting to \$6,000 or \$8,000.

At the Eureka Con.

The Locan shaft has been sunk an additional 15 feet. During the few days that the water was pumped from the bottom of the Locan shaft to the surface, only a slight decrease was observable, but it is said that some of the drifts in the Richmond mine that had been under water for several years became perfectly dry. A few days ago Mr. Read commenced pumping the water up to the drain drift, which is 840 feet from the surface, since which it has been handled with ease, and there has been no obstacle in the way of the miners, who have been kept steadily at their work, sinking without interruption. I am told that the drifts in the Richmond mine, above mentioned, are again under water, and have been so since the Eureka Con. Co. have resumed the drainage through the 840 drift.

Judging from this, it will pay the Richmond Co. to join the Eureka Con. Co. in the expense of pumping, and in the event of their doing so, they might be enabled to drain both mines at a slight additional cost.

I am reliably informed that a very important movement is to take place here shortly in reference to

The Slag Dumps

At one or more of our furnaces, not to be made public, however, until all the arrangements are completed, but which, if successful, will certainly work a revolution in our district, as it will solve the problem of

smelting very lowgrade ores. This, added to the plan contemplated for working dry ores by lixiviation process, particularly those from the mines on the quartz belt of Adam's Hill, will doubtless be the means of bringing into renewed activity every mine in Eureka district, from the most extensively operated down to the smallest prospect.

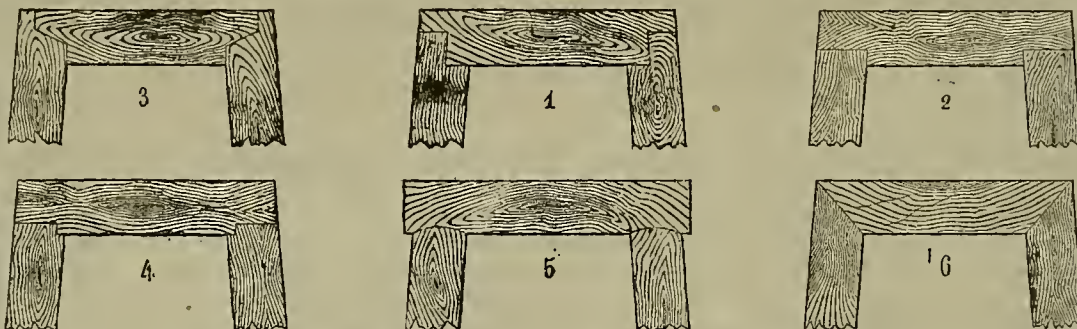
The Richmond Company

Have reason to congratulate themselves on the bonanza that they are at present, and for several weeks past, have been uncovering in the slag pile at their own furnaces, the accretions in which are still proving immensely profitable, and the successful working of the same is due to the present intelligent management. To Mr. L. W. Davis, under Mr. Edward Probert, the general manager, is due the credit for a knowledge of the science of smelting superior to that of any of their predecessors. M. H. JOSEPH.

THE SILVER BELT MINE, in Big Bug district, is the property of D. C. Thorne, W. W. Hutchison and Mr. Symes, of this county, who have stuck to the Belt through evil and good report. Four months ago, when work was started anew, the company owed \$31,000, almost every dollar of which has been paid by profits from the mine, which is to-day the best little mine in America. A few miners take out daily three and one half tons of ore, worth at least \$203,000. This ore is packed on mules a distance of about eight miles to the Howell smelter. We believe Mr. Thorne's partners will accord him the credit of having been the "bravest" among them, for, when at times the vein was looking delicate, they felt like taking a rest, when Thorne was just in the humor of "seeing more" of it.—*Courier*.

THE Walker Lake Bulletin says that the first clean-up of the Cat Creek mill was a financial success. This settles the question as to the future of Wild Cat canyon and Cat creek. There is plenty of rich ore in sight in that country to keep several mills going, and the ledges are as numerous as in any part of the Wasatch range.

RENO now claims to have found a seven foot ledge of plumbago near its town limits.



DIFFERENT METHODS OF FRAMING MINE TIMBERS.

tle men in explanation of their mistakes, implies little fitness on their part for performing the task they had undertaken. It is hardly possible that they could have been imposed upon by a device so difficult of execution and yet so easy of detection. What seems more probable is that Messrs. Williams and Anderson, not having much experience as viewers of mines, were by their guides made to believe that much of the barren rock they saw was really rich ore.

Seeking Legal Redress and the Result.

Believing that they had been swindled by Mr. Park and his associates, the English directors instituted suits against these parties to recover the money paid for the mine. While these legal proceedings failed of that end, Mr. Park, who under foreclosure of mortgage finally came into possession of the property, voluntarily restored the same to the English company, under an arrangement that evinced on his part a willingness to act fairly, and even a desire to do right, and which, having been acquiesced in by the Board of Directors, afterwards met with the approval of most of the shareholders.

Under this arrangement, which was effected in 1880, a new company was formed with a nominal capital of £700,000, divided into 70,000 shares, 50,000 of which go to the original shareholders, the balance being apportioned among the debenture holders and vendors; a portion to be applied also in liquidation of indebtedness. Preference debentures receive £9,163 cash; ordinary £28,000 cash, and £52,820 in fully paid up shares. Of the remaining shares 11,000 go to Mr. Park and the vendors; 1,218 are to be used for general purposes, Mr. Park, subscribing for 2,500 shares, one half payable at once and the balance as required; the proceeds to be used as working capital. The entire property, with clear title, is conveyed to the new company, the old being liquidated. All legal proceedings are dismissed and mutual releases given to the company, the American defendants and Baron Grant.

The Re-constructed Emma.

The arrangement above described having been completed, work was soon after resumed on this much mismanaged, somewhat maligned and altogether unfortunate property, very little having been done upon it during the preceding seven or eight years. Owing to the wretched

rock does not affect it. If the ore extends through the rock continuously the machine will show it by holding the points on opposite sides of the rock. It will show whether the rock carries mineral or not, and also the comparative quality of ore. If one pole is placed in contact with ore in any mine and the other pole applied to a supposed extension of the vein it will show at once whether it is the extension or not. What is called static electricity is used, and the theory is based on the conductivity of metals for electricity. Copper and gold give distinct flames; copper, a greenish flame and gold a purple, while silver, lead, iron, etc., are white. This machine will prove of great value to prospectors, as they can test any float rock or specimen and tell in a minute whether it carries mineral, and whether much or little. The machines can be carried on the back, like a knapsack.—*Eureka Sentinel*.

Mine Timbering—No 8.

In the last number of the PRESS we gave some drawings showing several forms of timbering adopted in French coal mines. They have quite a variety of ways of working their timber, many of them devised particularly to economize the article which is scarce there. On this page are shown several of the methods of framing adopted. These are such as are in use in several parts of the world, as well. By referring to previous articles in this series, the difference between these systems and ours in use on this coast will be seen. The method of framing is so plainly shown in the engraving, that no detailed description is necessary.

A HOT PLACE.—Work is still progressing in the southeast drift on the 2,500 level of the Con. Virginia, but a good deal of water is coming in, and the drift is fearfully hot—almost seals the hair off the heads of the miners. None of the men working in that drift hanker after Russian baths. Their thoughts are of the ice fields of Alaska.—*Virginia Enterprise*.

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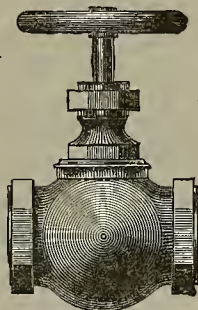
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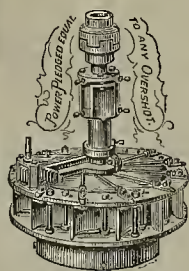
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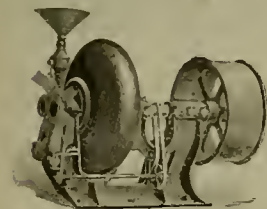
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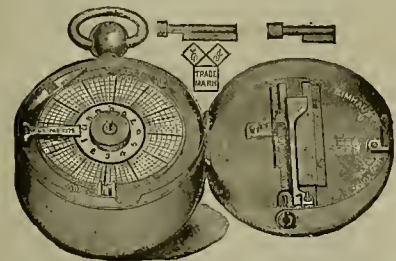
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The Pacific Coast offers a good market for useful inventions. This office offers convenient and central quarters where inventors can exhibit and explain their models free of charge. Reliable Agents in Eastern States. Circulars sent free.

Inventors MODEL MAKER.

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ALSO, LEAD PIPE, SHEET LEAD, SHOT, ETC.

This Company has the best facilities on the Coast for working

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IN THEIR VARIOUS FORMS.

PRENTISS SELBY, - - Superintendent

California Inventors

Should consult DEWEY & CO., AMERICAN AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as journalists and large practice as patent attorneys enables them to offer Pacific Coast inventors far better service than they can obtain elsewhere. Send for free Circulars of information. Office of the MINING AND SCIENTIFIC PRESS and PACIFIC RURAL PRESS, No. 252 Market St., S. F. Elevator, 12 Front St.

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Rooms 7, 8 and 9.

No. 320 California Street, S. F.,

(Over Wells, Fargo & Co.'s Bank.)

Special Attention Paid to Patent Law.

N. B.—Mr. J. L. Boone, of the above firm, has been connected with the patent business for over 15 years, and devotes himself almost exclusively to patent litigation and related branches.

COPP'S U. S. MINERAL LANDS,

Laws, Forms, Instructions and Decisions.

Has no surplusage. Contains Dr. Raymond's Glossary. Explains how to examine mining titles. Contains numerous court decisions. Gives the Public Land Commission's Codification, and gives many and improved forms. Price—Full law binding, extra paper, 650 pages, \$5.00. For Sale by DEWEY & CO., San Francisco.

IRON SLUICE RIFFLE.

I have an Iron Riffle, adapted for Hydraulic, Drift and Quartz sluices, which is proving very efficient, below everything else. (Cost six cents per pound.) Address, ALMARIN B. PAUL,

Room 20, Safe Deposit Building, San Francisco

The following speaks for itself:

INDIAN SPRING DRIFT MINE, Feb. 26, 1883,

Mr. A. B. Paul:—I have tried your Riffles thoroughly, and find them a fine Riffle. They are good with quicksilver or without. They gather the fine gold and rusty gold. I find gold that will not touch quicksilver stops in them, and which glides over 300 feet of sluice above them. I shall try 30 more, and if they save the same amount of gold in four weeks' run, I shall want 100 more. I am not afraid to vouch for them. B. C. McLANE, Superintendent Indian Spring Drift Mine.

WHITALL, TATUM & CO.,

NEW YORK. PHILADELPHIA.

—MANUFACTURERS OF—

CHEMICAL AND OTHER GLASSWARE.

CATALOGUES SENT UPON APPLICATION.

Redlands.

Good water, rich soil and magnificent view. High elevation, dry air, few fogs and northerly.

No fence or fence on the land, which is especially adapted to the culture of the orange and raisin grape.

Near to church, school, store and depot. Hotel open. Telephone Communication.

Stage from San Bernardino Tuesdays, Thursdays and Saturdays.

The price of land has steadily advanced from the first price of \$50 per acre until now it is held at \$200 per acre.

SEND FOR CIRCULAR.

JUDSON & BROWN,

Redlands.

SAN BERNARDINO, CALIFORNIA.

LORD'S

Boiler Cleansing Compound.

For the prevention and removal of Scale in Steam Boilers, and for Neutralizing Acid Sulphur and Mineral Waters.

Important safeguard and remedy for all users of steam. For Circulars and all information regarding its use, please apply at office of the Agents,

JOHN TAYLOR & CO.

118 & 120 Market and 15 & 17 California St., San Francisco

FIGARI & RICHMOND'S BOILER AND TUBE COMPOUND

We guarantee our COMPOUND to remove all scale and prevent any more being deposited. The COMPOUND forming a glazed surface on the iron, to which no scale will adhere and which preserves the iron.

The preparation is strictly vegetable, and is warranted to do all that is claimed for it without injury to the metal. Send for a circular.

H. P. GREGORY & CO., Agents,
San Francisco.

PACIFIC POWER CO.

Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

This paper is printed with Ink Manufactured by Charles Ene Johnson & Co., 506 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—J. H. Dorey, 529 Commercial St. S.

N. W. SPAULDING'S



PATENT DETACHABLE TOOTH SAWS,
Manufacture, 17 & 19 Fremont St., S. F.

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Dealer in Leonard & Ellis Celebrated

TRADE MARK



STEAM CYLINDER AND MACHINE OILS,
The Best and Cheapest.

These Superior Oils cannot be purchased through dealer and are sold direct to consumer only by H. H. BROMLEY sole dealer in these goods. No-oil—Any first-class Engine or Machine Builder in America. Address, 43 Sacramento St., S. F.

THE BEST IN USE!



This is the only Scientifically Constructed Bucket in the market. It is struck out from charcoal stamping iron. No corners to catch. No seams to burst. No interior corners to clog up. It runs with great ease, and half the power of the old style bucket. WILL OUT-WEAR HALF A DOZEN OF THEM.

PRICES REDUCED

T. F. ROWLAND, Sole Mfr.
Brooklyn, N. Y.

H. P. GREGORY & CO., Agents, San Francisco, Cal., carry a stock of all sizes.

San Francisco Pioneer Screen Works

J. W. QUICK, MANUFACTURER.

Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.
32 Fremont Street, San Francisco.

QUICKSILVER.

THE CELEBRATED A BRAND.

Shipped Direct from the New Almaden Mine,
New Almaden, Santa Clara Co., Cal.

For sale in any quantity. Trademark A on top of Flasks secured by United States Patent, and registered. Flasks contain 704 lbs. Quicksilver. Weight and purity guaranteed. CARGO LOTS will be shipped from San Jose, Cal., for Nevada, Arizona, New Mexico, Montana and Idaho or Utah, or delivered at Pacific Mail Steamship Co.'s wharf, and Depot of S. P. R. R. Co., San Francisco, without charge. Railroad rates from San Jose are the same as from San Francisco.

J. B. RANDOL,

P. O. Box, 1073. 320 Sansome Street, S. F.

Dewey & Co. { 252 Market Street, } Patent Agts

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

FOR WEEK ENDING APRIL 10.

- 275,348.—OPTOMETER—L. A. Berteling, S. F.
275,600.—ELECTRIC SIGNALING APPARATUS—Chas. Cummings, Va. City, Nev.
275,471.—STEAM BOILER—Geo. W. Dickie, S. F.
275,473.—PUMPING APPARATUS—William R. Eckart, S. F.
275,475.—ARITHMETICAL CHART—Jas. B. Finch, San Jose, Cal.
275,765.—FLUID PRESSURE GAUGE—F. G. Hesse, Oakland, Cal.
275,390.—HYDROCARBON BURNER, ETC.—Wm. Jasper, Santa Cruz, Cal.
275,504.—METAL TUBE FORMER—H. E. Lea, S. F.
275,689.—PORTABLE STACKING DERRICK—L. T. Mitchell, Galt, Cal.
275,524.—REMEDY FOR AGUE—C. L. Robinson, S. F.
285,529.—BOAT DETACHING APPARATUS—Thos. H. Sellers, Vallejo, Cal.
275,530.—SIPHON—Chas. E. Sherman, S. F.
10,312 (Re-issued).—SAW TOOTH—N. W. Spaulding, S. F.
275,537.—WINDOW BLIND—Jos. Williams, San Jose, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press American and Foreign Patent Agency, the following are worthy of special mention:

BOAT DETACHING APPARATUS.—Thomas H. Sellers, Vallejo. No. 275,529. Dated April 10, 1883. This is intended to be applied not only to detaching boats when they are to be launched from vessels, but for again re-attaching them to the falls when they are to be hoisted to the davits. It consists of a horizontal shaft turning in boxes in the bottom of the boat, and having its ends enlarged with longitudinal slots, which extend to the center line of the shaft, so as to admit the free ends of bolts which have their opposite ends hinged in line with the shaft. Suspending links are hooked upon these bolts and connected with the tackle, and when the shaft is turned by a lever until the slots are upward, the free ends of the bolts are drawn out and allow the links to slip from them so the boat is free to fall. Each boat is provided with two sets of links, so the second set may be connected with the bolts, and be ready to connect with the boat when it is to be taken up again.

ARITHMETICAL CHART.—James B. Finch, San Jose. No. 275,475. Dated April 10, 1883. This is an arithmetical or number chart for purposes of instruction. It consists of a sheet having certain figures written in lines across it, with intervening signs for multiplication, division, addition or subtraction, and in combination with this sheet of slips having numbers pointed in a single vertical line upon each. The large sheet is fixed in a frame having slots at one side into which the slips are placed, and they may be moved up or down, so as to produce, with the figures upon the large sheet, new combinations or examples. The invention is intended to provide a simple arrangement of numbers, with the proper intervening signs, to give a number of different examples, and with these series of examples are employed slips having numbers arranged vertically, so that by moving a slip up or down, the examples may be changed.

SIPHONS.—Chas. E. Sherman, S. F. No. 275,530. Dated April 10, 1883. The invention relates to an improvement in siphons, by which they may be effectually kept clear of air, which will in time accumulate in the upper part of an ordinary siphon, and, if not removed, will stop the flow through the apparatus. It consists in the combination with the pipes of a siphon of a second discharge pipe and chamber, into which the upper ends of the pipes open independently, so that the interior of the chamber is also connected with the pipes, and any air which may have accumulated in this chamber will be forced into the discharge pipe, which acts as an air pump.

WINDOW BLIND.—Joseph Williams, San Jose. No. 275,537. Dated April 10, 1883. The blind consists of a number of independent parallel strips, pivoted above and below to peculiar guides which are pivoted to the window frames. The strips are so arranged that when the guides are horizontal said strips are extended so as to cover the window; but when the guides are raised to a vertical position the strips fold on one another and lie in a narrow compass at the sills of the window frame. The object is to provide an effective window blind; easy to open and close, and little liable to become disarranged.

TWO-WHEELED VEHICLE.—Willis O'Brien, S. F. No. 275,512. Dated April 10, 1883. The object of this invention is to render a two-wheeled vehicle an easy riding conveyance by relieving the body of the jogging motion of the horse. The improvements consist in a peculiar spring connection for the front of the body to limit and ease its play, and in a novel attachment of the whiffletree, whereby the freedom of the shafts, and the consequent independence of the body, may operate to the best effect.

REMEDY FOR AGUE.—Chas. L. Robinson, S. F. No. 275,524. Dated April 10, 1883. This compound is good as medicine in cases of fever and ague. It is to be taken internally. The peculiar ingredients used in the compound are patented in this connection.

A Mineral Exposition.

A short time since we published an account of a meeting of citizens at the State Mining Bureau to consult on the question of making a free exposition of the mineral and material resources of the Pacific coast. The coming summer will afford a great opportunity for the display of our mineral resources, as many strangers will be here.

A committee was appointed, consisting of the following gentlemen: Melville Atwood, L. L. Bullock, W. M. Bunker, Wm. T. Coleman, James V. Coleman, C. O'Connor, J. Z. Davis, John Daggett, Warren B. Ewer, S. Heydenfeldt, Jr., C. A. Hooper, Geo. T. Marye, Jr., W. H. Mills, Almarin B. Paul, I. M. Scott, J. R. Scupham, Chas. M. Tyler.

This committee has addressed a circular to the Board of Supervisors of each county in the State, setting forth the object of the Exposition and asking the county to be represented. The propositions are as follows:

First—It is proposed that the citizens of the city and county of San Francisco (and liberal minded citizens of the State who may so desire) raise all the funds required to project and carry out a Free Pacific Coast Mineral Exposition, and make the display one of unequalled attraction and interest to all who may visit the city.

Second—That the respective counties, and the citizens thereof, be earnestly solicited to contribute the sum of \$100 for each county, by appropriation or by private subscription, which may be sent to Lloyd Tevis, Esq., Treasurer of this Citizens' Exposition Committee, to go into what may be styled "The County Case Fund of the State Mining Bureau and Museum," to provide neat and uniform cases which will bear the names of the respective counties so contributing.

It is also most earnestly requested that immediate measures be taken by the respective boards to solicit specimens which may be sent by express, free, directed to the State Mining Bureau, with names of donors, which will appear on printed display cards in the respective county cases. Many relics, fossils, etc., will, no doubt, be sent which cannot go in cases, and for these a county space will be assigned by the committee.

When you feel out of sorts, have the blues, melancholy, etc., it must be indigestion that ails you. Brown's Iron Bitters cures it.

EXCELSIOR POWDER.—Attention is called to an advertisement of the Excelsior Powder Co. in another column. The company has been thoroughly reorganized and intend now to manufacture on a larger scale than heretofore. The powder has been on the market some little time, and is well known among mining men. It is represented as being not only very strong, but emits no disagreeable fumes or gases.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent.

"DUNCAN" ROCK DRILL!

FOR MINES, QUARRIES, ETC.

J. CUYAS, Agent,

10 Park Place, New York.

News in Brief.

THE Marquis of Lorne will probably succeed the Marquis of Ripon as Viceroy of India.

At Castle Garden, in one day this week, 4,469 immigrants landed from six foreign steamships.

THE railroad company is fairly at work extending the California and Oregon railroad northward.

THE Saratoga paper mills were burned Sunday night. Loss, \$40,000; insurance, \$18,000. The stock destroyed was principally straw paper.

CABBAGES continue to arrive from Germany, although a duty of ten cents is collected, and turnips are brought from Russia.—*New York Tribune.*

ABOUT 1,200 persons have contributed from \$175,000 to \$200,000 for the development of the Keeley motor, and the process of development is not yet finished.

THREE ore teamsters were fired on by Apaches in the Santa Rita mountains on the 13th inst., and two killed, one escaping. One of the men killed was named Thornburg. The Indians took the teams.

MANITOBA has entered a protest against the action of the Dominion Government looking to an increase in the duty on agricultural implements from the United States.

THE Boston *Advertiser* thinks the time is near at hand when the Pacific Coast will be able to compete successfully with the South or the entire country in the canned fruit trade.

DURING the first nine months of the current fiscal year, the internal revenue receipts were \$108,825,798, an increase of \$251,398 over the corresponding period last fiscal year.

GEN. CROOK does not believe the Indians can be successfully fought with regular troops, and will, therefore, employ Indian scouts, to which the Mexican authorities have assented, and will permit Cook's scouts to cross the borders in pursuit of the hostiles.

THE Mexican Central railroad company has signed a contract with the government consolidating all concessions made to the company since September, 1881. The first train from Washington at Mexico is expected next spring. It will be made a great festivity.

A WARDEN of the Cook county, Ill., hospital is made to say that one Chaffee, the County Undertaker, sells seventy-five per cent of the bodies to the medical colleges in Chicago and other cities, and that his revenue from this source has exceeded \$6,000 annually.

THE New Orleans *Picayune* reckons up a total of \$393,500,000 profit to American builders of Mexican railroads through Government subsidies, and suggests that the Republic is being practically sold out to "New York and Boston millionaires."

JAY GOULD, it is said, has declared his intention to retire from active business life on the completion of his steam yacht, *Atlanta*, built for his projected tour around the world. His son, George G. Gould, a young man of twenty-three years, is to take his place as a speculator. Gould is forty-seven years old, and his wealth is estimated at \$100,000,000.

THE information filed in the Superior Court of Colusa, charging Huron Miller with the murder of Dr. H. J. Glenn, was, on motion of Jackson Hatch, attorney for Miller, set aside. The ground was that Miller had not been legally examined and committed by a magistrate. Miller was discharged, but was immediately re-arrested and his examination set for Saturday, April 28th.

THE *Chico Record* of the 14th says: The land about Vina, which is nearly all owned by ex-Governor Leland Stanford, is fast settling up with a thrifty class of people from the East. Yesterday afternoon a carload of eastern immigrants passed through Chico to locate at this place, and two more carloads will pass through this evening.

NERVOUSNESS, peevishness, and fretting, so often connected with overworked females' lives, is rapidly relieved by Brown's Iron Bitters.

Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First St., a Rutheford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiry concerning it. It is suitable for a pulverizing mill for powder or other substances. Reference as to above can be had upon applying to this office.



EXCELSIOR BLASTING POWDER.

Manufactured by the

EXCELSIOR POWDER COMPANY.

This is no raw, patent, non-explosive Safety Powder, but the Genuine Standard Nitro-glycerine Powder, as safe to use and handle as any other Nitro-glycerine Powder manufactured. The fumes and gases, common in nitro-glycerine powders, are destroyed, and do not leave the miner with headaches or nausea.

The powder is put up in cartridges of any size to suit the consumer, and is exploded in the same manner as all other high explosives; that is, by means of cap and fuse, or by electricity. It is not claimed for this powder that it is a non-explosive, or safer than other nitro-glycerine powder. All powder, and especially nitro-glycerine powder, should be handled carefully. The EXCELSIOR POWDER is as safe, and for strength far surpasses any other powder on the market. Address all orders to

EXCELSIOR POWDER COMPANY,

Room 9, No. 3 California St., San Francisco, Cal.

SEEK

health and avoid sickness. Instead of feeling tired and worn out, instead of aches and pains, wouldn't you rather feel fresh and strong?

You can continue feeling miserable and good for nothing, and no one but yourself can find fault, but if you are tired of that kind of life, you can change it if you choose.

How? By getting one bottle of BROWN'S IRON BITTERS, and taking it regularly according to directions.

Mansfield, Ohio, Nov. 26, 1881.

Gentlemen—I have suffered with pain in my side and back, and great soreness on my breast, with shooting pains all through my body, attended with great weakness, depression of spirits, and loss of appetite. I have taken several different medicines, and was treated by prominent physicians for my liver, kidneys, and spleen, but I got no relief. I thought I would try Brown's Iron Bitters; I have now taken one bottle and a half and am about well—pain in side and back all gone—soreness all out of my breast, and I have a good appetite, and am gaining in strength and flesh. It can justly be called the king of medicines.

JOHN K. ALLENDER.

BROWN'S IRON BITTERS is composed of Iron in soluble form; Cinchona the great tonic, together with other standard remedies, making a remarkable non-alcoholic tonic, which will cure Dyspepsia, Indigestion, Malaria, Weakness, and relieve all Lung and Kidney diseases.



THE ALBANY CYLINDER OIL

Has its globuls undisturbed, stands fire test of more than 500 degrees, is perfectly free from acids or oxygen, clogs with more tenacity to the metal, and better resists the great pressure and heat of steam than any other lubricant.

LARGEST STOCK OF

GENUINE EASTERN OILS

In this City.

HEADQUARTERS

—FOR THE—

Albany Lubricating Compound

TATUM & BOWEN,

25, 27, 29 and 31 Main St., San Francisco

187 FRONT ST., PORTLAND.

NATIONAL COMPRESSORS and ROCK DRILLS.

EDWARD A. RIX, Agent,

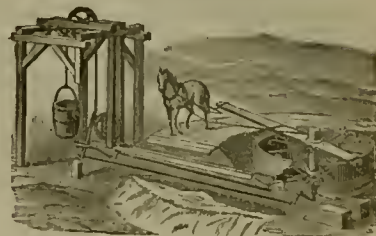
47 and 49 Fremont Street, San Francisco, Cal.
IRON AND STEEL WIRE HOISTING ROPES.

ORE
CARS.

WIRE ROPE
BRODERICK & BASCOM ROPE CO.

ORE AND
Water Buckets.
BELT
Compressors.

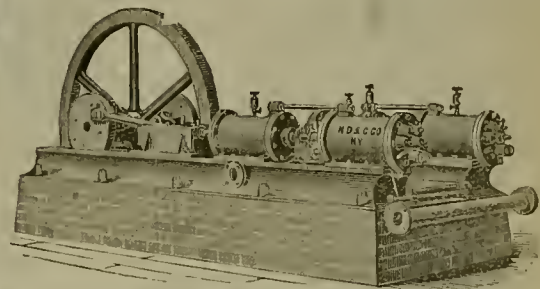
HORIZONTAL AND VERTICAL ENGINES
1 to 100 Horse Power



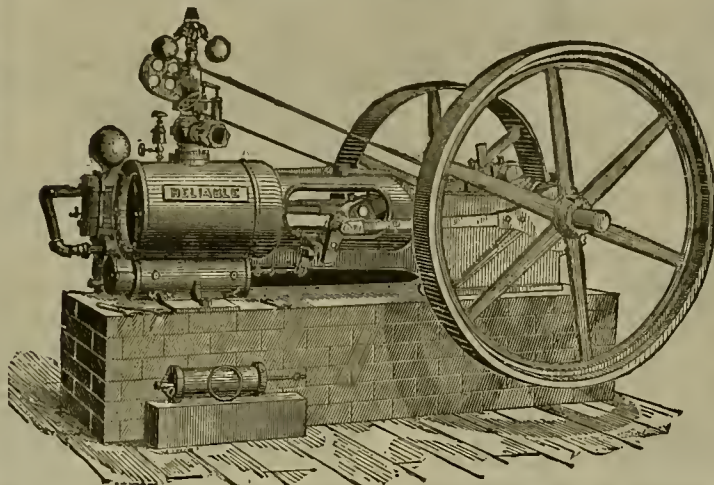
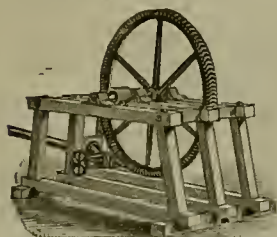
MINERS' HORSE-WHIM

One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The whim is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of the whim is bolted to bed-timber, thus avoiding all frame work. When required these whims are made in sections to pack on mules.

NATIONAL DUPLEX COMPRESSOR.



KNIGHT'S
Mining Water Wheel.
OVER 200 IN USE IN CAL.



Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

NOTICE OF THE APPLICATION —OF THE—

South Comstock Gold & Silver Mining Co.
For Dissolution and Disincorporation.

Notice is hereby given that the South Comstock Gold and Silver Mining Company has this day filed with the Clerk of the Superior Court of the City and County of San Francisco an application for Dissolution and Disincorporation, and all persons desiring to file objections to such application are hereby notified to file such objections within thirty days after the first publication of this notice.

March 8, 1883. WILLIAM T. SESNON, Clerk.
Date of first publication. } O. Z. SOULE, Deputy Clerk.
March 16, 1883. }
WHITE MORE & McKEE, Attorneys for Petitioners.

DIVIDEND NOTICE.

OFFICE OF THE
Northern Belle Mill & Mining Company.

San Francisco, April 10, 1883.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 71, of fifty cents (50c.) per share, was declared, payable on MONDAY, April 16, 1883. Transfer books closed on Friday, April 13, 1883, at 3 o'clock p. m.

WM. WILLIS, Secretary,
Office—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

Buchanan Gold Mining and Milling Company.—Location of principal place of business, San Francisco, Cal.; location of works, Tulumne, Tulumne county, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the 3th day of March, 1883, an Assessment (No. 2) of Five (5) Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, room 3, No. 121 Post Street, San Francisco. Any stock upon which this Assessment shall remain unpaid on the 2d day of May, 1883, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on FRIDAY, June 1, 1883, to pay the delinquent Assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, F. J. SULLIVAN, Secretary.

OFFICE—Room 3, 121 Post Street, San Francisco, Cal.

ASSESSMENT NOTICE.

Seaton Gold Mining Company.—Location of principal place of business, San Francisco, California; location of works, Drytown, Amador county, Cal. Notice is hereby given that at a meeting of the Board of Directors, held on the 10th day of April, 1883, an assessment (No. 2) of seven and one-half cents (7½) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Treasurer, A. Warner, at his office, No. 224 Kearny Street, room 2, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1883, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 5th day of June, 1883, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, A. MARTIN, Secretary.

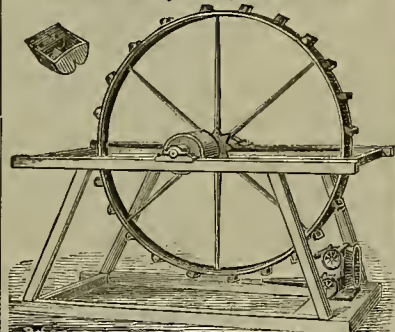
OFFICE—Room 6, 523 California Street, San Francisco, California.

NOTICE TO CONTRACTORS.

Sealed proposals will be received by the Brandy City Mining Company until May 1, 1883, to run a bedrock tunnel to its mining lands, situated at Brandy City, Sierra County, Cal., near the town of Camptonville, Yuba County. Said Tunnel to be about 3,000 feet long, 6 feet wide and 8 feet high, with a grade of 5 inches to every 12 feet. Water Power furnished. Responsible parties only need apply. Privilege reserved to reject any and all bids. For further particulars inquire of

CHAS. ALLENBERG, Sec'y.,
630 Brannan Street, San Francisco, Cal.

PELTON'S PATENT Reaction Hurdy Gurdy Water-Wheel.



This Wheel will be guaranteed to purchasers to give 82% of the theoretical power of water. For Send for circular to L. A. PELTON, Nevada City, Nevada Co., Cal.

Books for Miners and Millmen.

KUTSEL'S CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for gold-bearing sulphurets, arseniurets, and gold and silver ores generally, with lithographic diagrams. 1867. This work is unequaled by any other published embracing the subjects treated. Post-paid, \$7.50. Printed and sold by Dewey & Co., S. F.

KUTSEL'S ROASTING OF GOLD AND SILVER ORES (Second Edition, 1880), and the Extraction of their Respective Metals without Quicksilver. Illustrated 166 pages. A valuable and carefully written work. Postpaid, \$3. Sold by Dewey & Co., S. F.

AARON'S LEACHING GOLD AND SILVER ORES.—The most complete hand-book on the subject extant, 164 pages, 4 clays. Illustrated by 12 lithographic engravings and four woodcuts. Fully indexed. Plainly written for practical men. In cloth \$3. Sold by Dewey & Co., S. F.

THE EXPLORER'S MINERS' AND METALLURGISTS' COMPANION, by J. S. Phillips M. E., comprising a practical exposition of the Various Departments of Exploration, Mining, Engineering, Assaying, and Metallurgy, so far as they relate to the Mining Industry. Price, bound in cloth, \$10.50. Sold by Dewey & Co., S. F.

MINING, ENGINEERING, MECHANICAL, FARMING, SCIENTIFIC, INDUSTRIAL AND NEW BOOKS in general can be ordered through Dewey & Co., publishers of the MINING AND SCIENTIFIC PRESS, S. F., at publishers' rates.

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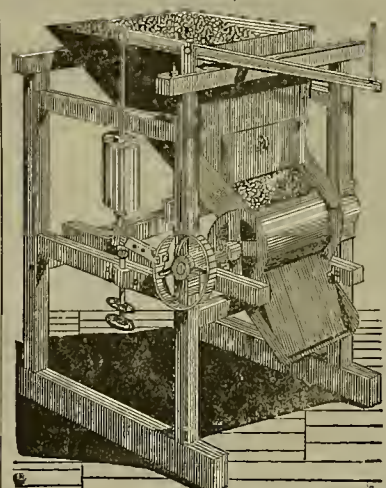
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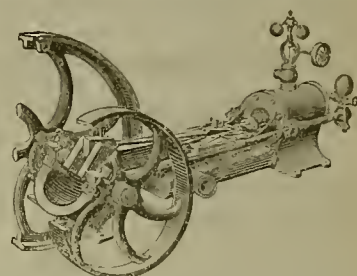
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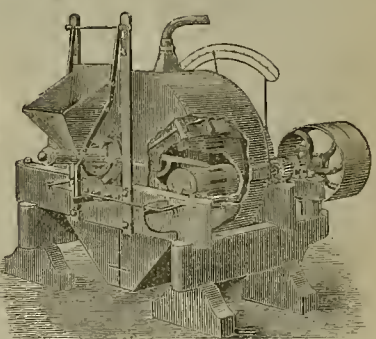
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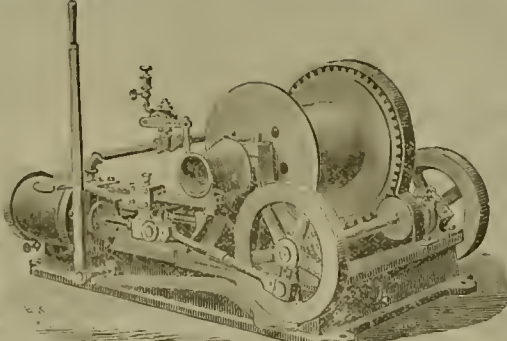
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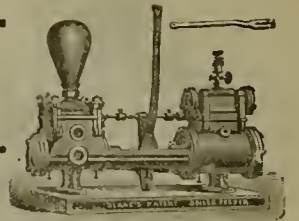
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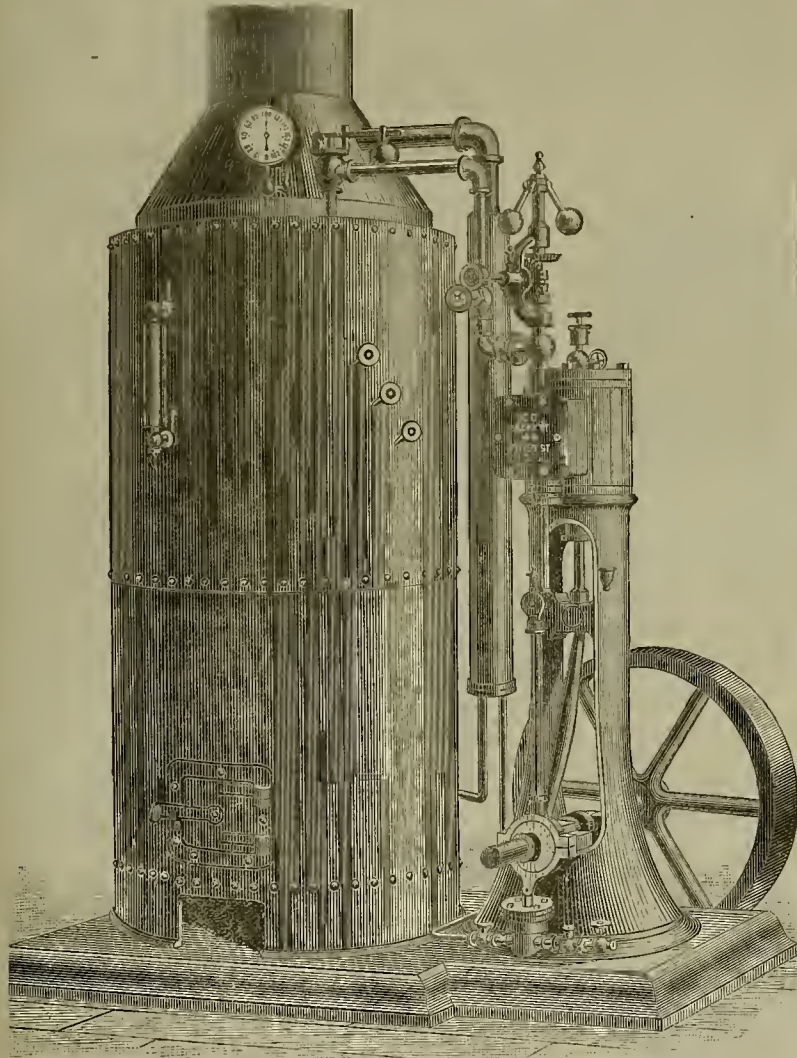
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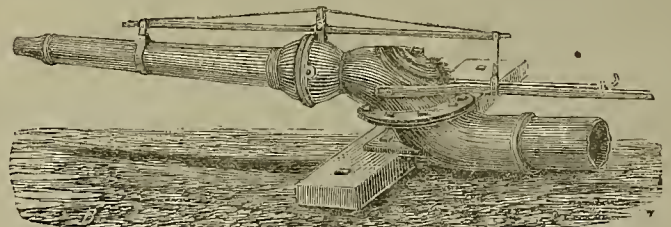
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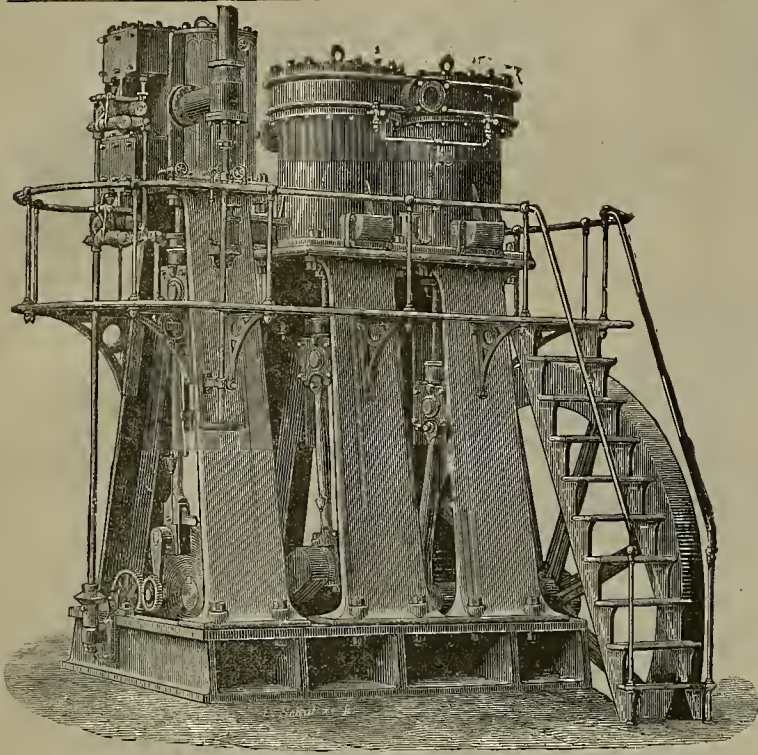
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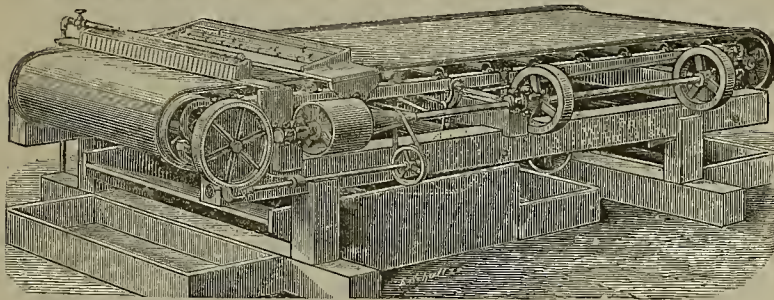
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Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

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Small Sizes made in Sections not to Exceed 300 lbs.

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—OR—
VANNING MACHINE.

Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order, and ready to make tests, at the office of Hinckley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ore is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec 22, 1874; Sept 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,
Room 7, 109 California Street, SAN FRANCISCO, CAL.
Nov 6 1882

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The Strongest, Most Uniform and best Nitro Glycerine Powder manufactured, at which we are prepared to furnish at very lowest prices.

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Adopted in the English Government and finest Railway Works and Steamship Companies in the world.

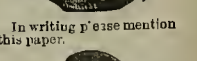
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News

ARIZONA EDITION—TWENTY-FOUR PAGES.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 28, 1883.

VOLUME XLVI
Number 17.

Copper Smelting Plant.

The illustration on this page represents the general form of construction of the Pacific copper smelting plants now in so much favor, and in use in many parts of the country. This arrangement of the machinery has been adopted after much study, with a view to construct the works so that the ore may require the least amount of handling in the course of the treatment of smelting, and also place the mechanical appliances in such relation to each other, that no more space will be required than is absolutely necessary, and at the same time have sufficient room for convenience. As will be seen the building is placed at the foot of the hill, and is divided into three floors.

The smelter is located upon the lower or ground floor. The ore, after passing through the crusher on the upper floor, is dropped down on to the middle or charging floor, when it is put into the smelter through an opening in the casing of the upper part of the smelter.

The plant, as shown, is intended for a Pacific copper smelter, having a capacity of handling thirty tons of ore a day. The manner of smelting the ore varies according to its character and the fuel employed. Ordinary carbonate or oxide ores require from twenty-five to thirty bushels of charcoal per ton, or from ten to fifteen per cent. of coke. Ores containing sulphur, arsenic, and antimony, should have their bases driven off before smelting. This can be done either by roasting in heaps or in a furnace made for this purpose. Ores carrying gold or silver can be worked to better advantage by converting the whole product into matte.

The construction of the smelter, which is, of course, the most important part of the entire machinery, is as follows: The body consists of a water jacket, which rests upon a heavy plate supported by four columns, the whole being placed upon a foundation plate. At the front of the furnace is placed a hulsion spout, and a slag spout is formed at one side near the bottom of the jacket. Above the spout is a wind box having suitable tuyeres for directing the blast to every part of the charge, which is received from the blower through a wind pipe at the rear of the smelter. The tuyeres, being entirely within the water space, are wholly protected from action of the heat, and consequently, never burn out or become a cause of trouble. Peep holes, with removable cap and mica covering, are arranged opposite each one, so the processes going on inside the furnace can be constantly observed.

The crucible is formed on a bottom, hinged to the plate, that can be instantly dropped when any obstruction occurs, or for access to the interior when repairs are necessary. A peculiar feature in the construction of the water jacket is the formation of circulating plates which create a rapid circulation of the water.

This device, by leaving no spot within the water space where the water is not in constant and rapid motion, causes the heat to be evenly distributed throughout the entire jacket, and thus prevents unequal expansion and contraction, and consequent leaky joints. The motion of the water also prevents any scale or sediment from depositing on the surfaces, and in this respect is of great advantage where the water used is highly mineralized. Great economy in the use of water is also attained by this device, as all the water introduced into the jacket is brought in contact with the heated surfaces, and none escapes the overflow without having absorbed all the heat possible. In many local-

ities where water is scarce, this point is one of much importance. Experience has shown this to be the most valuable improvement ever made in water-jacket smelters, adding at least two or three times to the effective wear and service of the jacket, besides saving in loss of time and cost of repair.

The smelters are made of ten, twenty and thirty tons daily capacity, the larger size being always recommended as the most desirable when the ore development will warrant, as it can be run more economically, both as regards fuel and attendance, than the smaller.

This size (thirty ton) water jacket requires about 25,000 gallons of water per day of twenty-four hours, when allowed to run to waste. When water is scarce it can be run into a reservoir and pumped into cooling tanks, requiring in this way only about 3,000 gallons. The blast for the smelter is furnished by a No. 4½ Baker blower. The breaker and blower are operated by separate engines, a ten-horse power engine required for the breaker, and that for the blower having a capacity of twelve-horse power. To complete the plant, a thirty-horse power tubular boiler, and a steam pump to feed same are provided.

This style of a smelting plant is so economically arranged as to warrant the erection of a

smelter upon any copper property carrying ore running as low as five per cent to eight per cent, circumstances being favorable as regards fuel and transportation. The extensive reputation which the Pacific copper smelter has attained certainly reflects much credit upon the manufacturers. Messrs. Rankin, Brayton & Co. report that they have now in hand orders for these smelters for Australia, South America and Mexico, besides a large number for various localities in this country.

Tucson Notes.

Our Arizona correspondent, B. W. Crowell, sends us the following notes from Tucson: "The Blue Jay mines are progressing with the work favorably. B. F. Carnes is President, Mr.

Mines near Johnson, Arizona.

Mr. J. G. Parke, Deputy U. S. Mineral Surveyor, kindly furnishes us with a few items about the region around Johnson, the newly laid-out town twenty-seven miles north from Tombstone, and seven miles from the Dragoon railroad station. The best and nearest mine to the town is the Peabody. There are now being erected two smelters of thirty tons capacity each. New hoisting works are also going up. Water is being brought in pipes from Russell, which will be ample for smelters, town, and all local purposes.

The "Old Mexican," now the Dreadnaught, Copper King, and Saratoga, are all being worked.

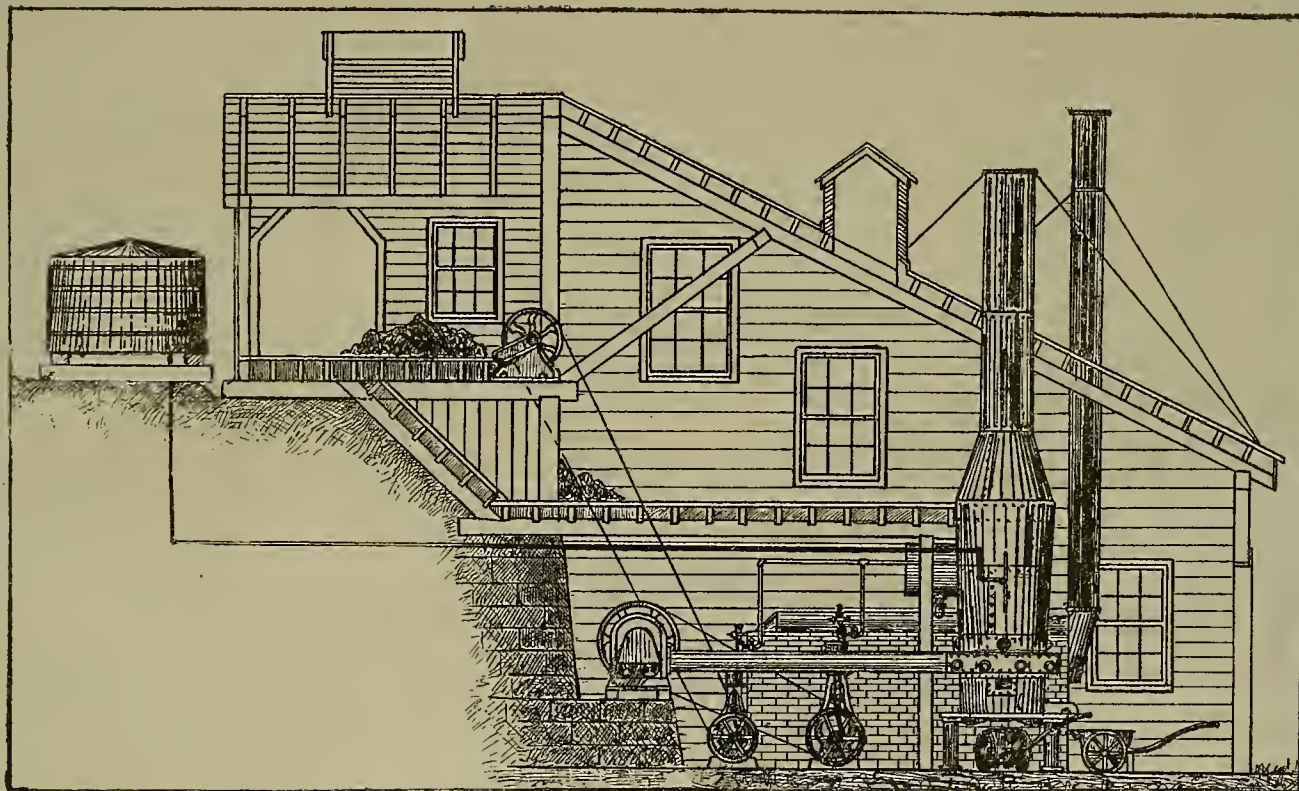
The Peabody is worked by Kansas City capitalists—Messrs. Underwood and Clark—under the able management of George J. Johnson. The roads are good, and there is plenty of wood as well as water in the neighboring mountains. They are working forty to fifty men in their different mines. The country around is considered a favorable one for prospecting. The Peabody Co. has now a large body of high grade ore exposed. In some of their chambers it is said to be forty to fifty feet wide in pay ore.

In the Chiricahua mountains, a range east of Sulphur Spring valley, and running on down to the Mexican line, where it becomes broken, there are many good mines. The Dunn mine, but little developed, has a small smelter. They are now negotia-

ting a sale with capital from Youngstown, Ohio. The Josephine is a partially developed mine on the same range, with a large body of high grade smelting ores of galena and carbonates. The great detriment and retarding influence has been the occasional Indian outbreaks, being on the trail from Sonora.

UTILIZATION OF PYRITES REFUSE FOR STEEL MAKING.—Experiments are now making at the Terrebonne works for utilizing the residue of iron pyrites. Briquettes are made with the conglomerated with hydraulic lime; and, by simple exposure to the atmosphere, an ore is obtained which is said to yield pig excellent for steel making purposes. The sulphur is believed to be completely counteracted by the lime, and there is no phosphorus. The company has large hauls of pyrites refuse that it has hitherto been unable to utilize.

EIGHT miners have been arrested and taken to Eureka to answer for having tarred, feathered and ridden on a rail A. P. Hodgdon, whom they believed had made an attempt to destroy Geddes and Bertrand's hoisting works, at Secret Canyon, although he had been acquitted of the charge in a jury trial.



GENERAL ARRANGEMENT OF PLANT FOR COPPER SMELTING.

Latest Instructions to Settlers upon the Public Domain.

A Digest of all the Settlement Laws and the Rulings Thereon.

The following circular of instructions relative to entries under the homestead, pre-emption, and timber culture laws, issued by the Commissioner of the General Land Office, under date of March 15, 1883, and addressed to Land Registers and Receivers, is valuable as embodying the provisions of all the land laws, and the construction placed upon them by the General Land Commissioner:

GENTLEMEN:—You are instructed to deliver to applicants for land under the homestead, pre-emption, or timber culture acts, a copy of this circular, and to especially call the attention of the applicant to the requirements of the law under which the application is made.

Residence of Applicant.

1. The applicant must in every case state in his application his place of actual residence, and the post office address to which notice of contest or other proceedings relative to his entry shall be sent.

Second Filings and Entries.

2. A party making a legal filing or entry under any one of the foregoing Acts exhausts his right under that Act, and cannot thereafter make another filing or entry under said Act.

Alterations in Applications.

3. Applications to amend filings or entries should be filed with the Register and Receiver, and be by them transmitted for the consideration of this office. Registers and Receivers will not change an entry or filing so as to describe another tract, or change a date after the same has been recorded.

Relinquishments.

4. Entries and filings made for the purpose of holding the land for speculation and the sale of relinquishments are illegal and fraudulent, and every effort in the power of the Government will be exerted to prevent such frauds and to detect and punish the perpetrators.

5. The first section of the Act of May 14, 1880, provides that when a pre-emption, homestead, or timber culture claimant shall file a written relinquishment of his claim in the land office, the land covered by such claim shall be held as open to settlement and entry without further action on the part of the Commissioner of the General Land Office.

6. This act refers to bona fide relinquishments of bona fide entries. An entry fraudulent in its inception is not an entry capable of being relinquished. It is an entry to be canceled upon a proper showing of the facts and circumstances of the case, whereupon the land will become subject to proper entry by the first legal applicant.

7. Purchasers of relinquishments of fraudulent filings or entries should understand that they purchase at their own risk so far as the United States is concerned, and must seek their own remedies under local laws against those who, by imposing such relinquishments upon them, have obtained their money without valuable consideration.

Settlers on Unsurveyed Lands.

8. Homestead and pre-emption settlers on unsurveyed lands are allowed three months after the filing of the township plat of survey within which to put their claim on record. Accordingly no party will be permitted to make final proof in any case until after the expiration of said three months.

The Homestead Laws

9. Homestead entries can be made for not more than one-quarter section, or 160 acres of land.

10. The Land Office fees and commissions, payable when application is made, are as follows:

In Alabama, Arkansas, Dakota, Florida, Iowa, Kansas, Louisiana, Michigan, Minnesota, Missouri and Nebraska—

LAND AT \$2.50 PER ACRE:

For 160 acres.....	\$18 00
" 80 ".....	9 00
" 40 ".....	7 00

LAND AT \$1.25 PER ACRE:

For 160 acres.....	\$14 00
" 80 ".....	7 00
" 40 ".....	6 00

In Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming—

LAND AT \$2.50 PER ACRE:

For 160 acres.....	\$22 00
" 80 ".....	11 00
" 40 ".....	8 00

LAND AT \$1.25 PER ACRE:

For 160 acres.....	\$16 00
" 80 ".....	8 00
" 40 ".....	6 50

11. When a person desires to enter a tract of land upon which he has not established a residence and made improvements, he must appear personally at the district land office and present his application, and must make the required affidavits before the register and receiver.

12. He must then establish his actual residence (in a house) upon the land within six months from date of entry, and must reside upon the land continuously for the period prescribed by law.

12. In the case of a single person, the actual residence must be established within the same

time, and must be continuously and actually maintained for the same period.

14. The homestead affidavit can be made before the clerk of the county court only in cases when the family of the applicant, or some member thereof, is actually residing on the land which he desires to enter, and on which he has made bona fide improvement and settlement, and when he is prevented by reason of distance, bodily infirmity, or other good cause, from personal attendance at the district land office.

15. In such case, the applicant must state in a supplemental affidavit the facts of such settlement, improvement and residence, what acts of settlement have been performed, and when made, the nature, extent and value of the improvements, what member or members of his family are residing on the land, and the length of time such residence has been maintained, and the cause, specifically, why the applicant can not appear at the local office.

16. A false oath taken before the clerk of the county is perjury, the same as if taken before the register or recorder.

17. The period of actual inhabitation, improvement and cultivation, required under the homestead law is five years.

18. In case of the death of a homestead party before making final proof the widow succeeds on the homestead right.

19. In case of the death of both father and mother, the right and fee inure to the minor children, if any.

20. The homestead right cannot be devised away from the widow or minor children.

Soldier's Homestead.

21. A Union soldier or sailor of the late war is entitled to a deduction from five years of the length of time (not exceeding four years) of his military service. But the soldier (or his widow, as the case may be,) must actually reside on the land at least one year before final proof can be made.

22. In case of the death of the soldier, and the death or re-marriage of the widow, the minor children of the soldier, by a duly appointed guardian, are entitled to the privileges of the father.

23. Neither the guardian nor the minor children are required to reside on the land, but the same must be cultivated and improved for the period of time during which the father would have been required to reside upon the tract.

24. The soldier may file a declaratory statement for a tract of land which he intends to enter under the homestead laws. The fee is two dollars, except in the Pacific States and Territories, where the fee is three dollars.

25. This statement may be filed either personally or by an agent, and the soldier thereafter is allowed six months within which to make his entry and commence his settlement and improvement.

26. The entry can be made only by the soldier in person at the local land office, and he must actually make his entry and commence his settlement and improvement within six months after his filing, and must continue to reside on the land and cultivate it for such period as, added to his military service, will make five years. But he must actually reside on the land at least one year, whatever may have been the period of his military service.

27. Entries cannot be made for a soldier by an agent or attorney.

28. After a declaratory statement has been filed, whether by an agent or otherwise, the soldier cannot file again. His rights are exhausted by the first filing, and if he does not within six months make his personal entry at the Land Office, and commence his settlement and improvements as required by law, he obtains no right to the land.

29. A soldier's homestead declaratory statement for a tract of land does not prevent anybody else from making an entry of the same land, subject to such right as the soldier may require by virtue of actual residence on the land, and full compliance with law. If the soldier does not establish his residence on the tract as required, the next comer may take the land.

30. Soldiers are not entitled to land, nor to bounty land warrants for their military service in the late war, nor can titles to land be obtained for them by agents or attorneys. All representations to the contrary are false, and soldiers and sailors are warned against imposition by parties who offer to locate land for them, or to sell their rights.

Commuted Homesteads.

31. Homestead entries can be commuted to cash only after actual inhabitation of the land by the homestead party, and his improvement and cultivation of it for a period of not less than six months.

32. A person who commutes a homestead entry can not move from the tract and settle upon other public lands in the same State or Territory as a pre-emptor.

33. Proof of settlement and cultivation for the prescribed period is to be made in the same manner as in pre-emption cases.

34. A person commencing a homestead entry when he has not actually resided upon the land and improved and cultivated it as required by law, forfeits all right to the land and to the purchase money paid, and, in addition thereto, renders himself liable to criminal prosecution.

35. A settler desiring to make final proof must file with the register of the proper land office a written notice, in the prescribed form, of his intention to do so, which notice will be published by the register in a newspaper, to be

by him designated as nearest the land, once a week for six weeks at the applicant's expense.

36. Applicants should commence to make their proof in sufficient time so that the same may be completed and filed in the local office within the statutory period of seven years from the date of entry.

37. The final affidavits and proof should be made before the register or receiver, but may be made before the judge, or in his absence, before the clerk of a court of record in the county and State, district or Territory, in which the land is situated. If in an unorganized county, the proof may be made in a similar manner in an adjacent county in the same State or Territory.

38. When proof is made before the county officers mentioned, the same must be transmitted by the judge or clerk of the court to the register and receiver, together with the same commissions and fees that the land officers would have been entitled to receive if the proof had been made by them and the testimony reduced to writing by them.

39. The land office commissions, payable at the time of making final proof, are as follows:

In Alabama, Arkansas, Dakota, Florida, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri and Nebraska—

LAND AT \$2.50 PER ACRE:

For 160 acres.....	\$8 00
" 80 ".....	4 00
" 40 ".....	2 00

LAND AT \$1.25 PER ACRE:

For 160 acres.....	\$4 00
" 80 ".....	2 00
" 40 ".....	1 00

In Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming and Colorado—

LAND AT \$2.50 PER ACRE:

For 160 acres.....	\$12 00
" 80 ".....	6 00
" 40 ".....	3 00

LAND AT \$1.25 PER ACRE:

For 160 acres.....	\$6 00
" 80 ".....	3 00
" 40 ".....	1 50

40. The fees for reducing testimony to writing in making final proof are, in the former States, 15 cents, and, in the latter States and Territories, 22½ cents for each 100 words. No other land office fees than those stated in this circular are payable or allowable in homestead cases.

The Pre-emption Law.

41. The qualifications required of a pre-emptor are that he (or she) shall be a citizen of the United States (or have declared an intention to become such); over 21 years of age or the head of a family; an actual inhabitant of the tract claimed; and not be the proprietor of 320 acres of land in any State or Territory.

42. A person who has removed from land of his own to reside on public land in the same State or Territory, or who has previously exercised his pre-emption right, is not a qualified pre-emptor.

43. Lands included in any reservation, or within the limits of an incorporated town, or selected as the site for a city or town, or actually settled and occupied for purposes of trade and business and not for agriculture, or on which there are any known salines or minerals, are not subject to pre-emption.

44. If the land is surveyed, but has not been "offered," the declaratory statement must be filed within three months from date of settlement. If upon "offered" land, the filing must be made within thirty days.

45. If the land is unsurveyed at the time of settlement, the declaratory statement must be filed within three months after the date of filing the township plat in the local office.

46. Failure to file a declaratory statement within the time prescribed makes the land liable to the claim of any adverse settler who does file notice of his intention at the proper time.

47. The land office fee for filing a declaratory statement is \$2, except in the Pacific States and Territories, where the fee is \$3.

48. A pre-emption filing can be made only by an actual settler on the land. A filing without settlement is fraudulent and no rights are acquired thereby.

49. The existence of a pre-emption filing on a tract of land does not prevent another filing to be made of the same land, subject to any valid rights acquired by virtue of the former filing and actual settlement, if any.

50. On offered lands proof and payment must be made within twelve months from the date of settlement.

51. If the land is not offered, proof and payment must be made within thirty three months from date of settlement.

52. A failure to make proof and payment as prescribed by law, renders the land subject to appropriation by the first legal applicant.

53. The same requirements of actual inhabitation and improvement must be observed under the pre-emption law as under the homestead law.

54. Failure to inhabit and improve the land in good faith, as required by law, renders the claim subject to contest and the entry to investigation and cancellation.

55. Final proof in pre-emption cases must be made to the satisfaction of the register and receiver, whose decision, as in other cases, is subject to examination and review in this office.

56. Publication of notice to make proof is required as in the homestead cases.

57. The final affidavit must be made before

the register or receiver, or before the clerk of the court of record in the county and State or Territory where the land is situated.

58. The pre-emptor is required to make oath that he has not previously exercised his pre-emption right; that he is not the owner of 320 acres of land; that he has not settled upon and improved the same to sell on speculation, but in good faith to appropriate it to his own exclusive use; that he has not made any contract or agreement, directly or indirectly, in any way or manner, with any person whomsoever, by which the title he may acquire from the United States shall enure in whole or in part to the benefit of any person except himself.

59. Any person swearing falsely forfeits all rights to the land and to the purchase money paid, besides being liable to prosecution under the criminal laws of the United States.

The Timber Culture Act.

60. A timber culture applicant is required to make oath that his filing and entry is made for the cultivation of timber and for his own exclusive use and benefit; that he makes the application in good faith and not for the purpose of speculation, nor directly or indirectly for the use or benefit of any other person whomsoever; and that he intends to hold and cultivate the land and to wholly comply with the provisions of the act.

61. Claimants under the timber culture act will be held to a strict compliance with the terms and conditions of the law.

62. Not more than one quarter of any section can be entered under this act.

63. Where 160 acres are taken, at least five acres must be plowed within one year from date of entry. The following, or second year, said five acres must be actually cultivated to crop or otherwise, and another five acres must be plowed. The third year the first five acres must be planted to trees, tree seeds, or cuttings, and the second five acres actually cultivated to crop or otherwise. The fourth year the second five acres must be planted to trees, tree seeds, or cuttings, making, at the end of the fourth year, ten acres thus planted to trees.

64. Perfect good faith must be shown at all times by claimant. Trees must not only be planted, but they must be protected and cultivated in such manner as to promote their growth.

65. Final proof may be made at the expiration of eight years from date of entry. It must be shown that for the said eight years the trees have been planted, protected and cultivated as aforesaid; that not less than 2700 trees were planted on each of the ten acres, and that at the time of making proof there are growing at least 675 living thrifty trees to each acre.

66. Where less than one quarter section of land is entered, the same proportionate amount of plowing, planting, and cultivation of trees must be done as required in entries of 160 acres.

67. If the trees, seeds, or cuttings are destroyed in any one year they must be replanted. A party will not be released from a continued attempt to promote the actual growth of timber or forest trees. A failure in this respect will subject the entry to cancellation.

68. Only an applicant for the land under the timber culture or homestead laws can institute a contest under the third section of the Act of 1878.

69. Contestants have a preference right to thirty days after cancellation in which to make entry of the land.

70. The Government will at any period, upon proper application to contest, or upon its own information, investigate alleged fraudulent or illegal timber culture entries, or alleged failure to comply with the law after entry, and such entries will be canceled under sufficient proof either of illegality or failure to comply with the law.

71. The land office fee for an entry of more than 80 acres is \$14; 80 acres or less, \$9.

Cautions to Applicants.

Persons making filings or entries under the homestead, pre-emption, or timber culture acts, are cautioned that the laws authorize entries to be made only for the use and benefit of the party making the same, and that entries or filings are not allowed by law to be made for the benefit of others nor for speculation, but all entries must be made in good faith, and the requirements of the law must be honestly and faithfully complied with. Very respectfully,

N. C. McFARLAND, Commissioner.

The following is from the Revised Statutes of the United States:

Section 2240. The register or receiver is authorized, and it shall be his duty to administer any oath required by law or the instructions of the general land office, in connection with the entry or purchase of any tract of public lands; but he shall not charge or receive, directly or indirectly, any compensation for administering the oath.

Penalties.

Sec. 5392. Every person who having taken an oath before a competent tribunal, officer or person, in any case in which the law of the United States authorizes an oath to be administered, that he will testify, declare, depose, or certify truly, or that any written testimony, declaration, deposition or certificate by him subscribed is true, wilfully and contrary to such oath, states or subscribes any material matter which he does not believe to be true, is guilty of perjury, and shall be punished by a fine of not more than two thousand dollars, and by imprisonment at hard labor not more

(CONTINUED ON PAGE 286).

MECHANICAL PROGRESS.

Curious Ideas About Compression.

An English professor has recently written to one of the engineering journals in reference to the matter of compression or cushion in the steam engine cylinders. He sets forth his premises by saying that "Cushioning is supposed to save steam by filling the passages, ports and other necessary clearance so that this has not to be filled with fresh steam, which does no work in filling them." His second proposition is to the effect that "Cushioning is often supposed, by relieving the crank from the duty of stopping the piston, and so diminishing the pressure upon the crank pin and bearing, to diminish the friction." While his last is, "Cushioning is found by experience to be necessary in the case of all high speed engines to prevent the sudden shock attending the admission of steam." He then goes on to say that "if an engine, when running at its greatest speed, knocks or bumps in its bearings, it is a sign that it is insufficiently cushioned;" then he goes on to give a theoretical explanation, speaking further on of pumps, reversals, inertia, joints, etc. He then takes the ground that the steam with which the clearance is filled is not at all gain, and, finally, winds up by concluding that cushion should not be carried further than sufficient to prevent bumping.

This is very important information for engineers. Most any of them could figure out just how far cushioning should be carried to prevent bumping. They can probably tell us precisely the number of pounds at all the variations of speed with enormous as well as with small clearance, etc., but the real fact of the question is, cushioning or compression properly applied to any engine means economy. We all know that air, if compressed, is heated; hence, compression means heat, or a saving of heat. We all know that if we compress sufficiently to make five, ten, fifteen, or twenty pounds of compression, that we really fill the volume of the cylinder after the exhaust valve is closed, providing the piston and all the working parts are tight with the volume of steam that represents twenty pounds pressure per square inch, or whatever the pressure may be. This certainly relieves any little working that there may be in the cross-head, in the crank connection, or shackle bar, and certainly allows the piston and all these parts to cushion gently, instead of covering up without any cushion, and making the inevitable—in that case—"chug," which is one of the things that working engineers invariably dread. If we compress twenty pounds, it requires a less volume of directly admitted steam by a large percentage of that twenty pounds than it would if the twenty pounds were not there. This does not need to be guessed at,—a certain volume of steam is saved. The compression, if proper, saves in repairs on the engine, and makes it work longer and work better. There is no doubt that this cushioning costs something, but it brings more benefit than it costs, undoubtedly, hence there is no necessity for using theory or moonshine with regard to the theoretical value of cushioning or compression. True it is that some of our best engineers never use it, but when their work is carefully indicated upon the basis of proper compression, the engine always runs quietly and economically from the coal pile. Cushioning is of as much necessity, based on experience, in a low pressure engine running fifteen revolutions, as it is in the electric light engines running 380 revolutions. Cushioning is of no more necessity on a locomotive with six feet drivers, making a mile a minute, than it is on any slow moving engine. It may require a larger amount of compression, with a higher speed, for the velocity is greater, the momentum is more, and the cushioning must of necessity be more in amount, or more per square inch. The real effect is no more or no less. The cushioning will relieve what might otherwise be disagreeable in its general effects, by allowing the piston, and consequently all the parts connected with it, to bring up gently, with something to overcome their tendency to go further than their connections would allow them, after the entire amount of steam in front of the piston has been exhausted, and nothing left for it to cushion upon.

Men who have experimented with cushioning practically, invariably use it to a greater or less extent. Cushion does not mean steam lead; there is no necessity for opening your steam valve two inches before the piston gets at the extreme end of its stroke, in order to obtain cushion, that is not what we mean,—nor would we give an engine steam one third of the stroke off for the sake of showing the compression line. Give your steam at the proper place and compress by the exhaust valve. These professors are curious fellows. They will make you believe, if possible, that the world is square, and that a drop of water has the power of getting up and going off somewhere, but when you come to put their theories into practice they are not always found to be true.

So with compression: try it carefully; try it only with the indicator; make sure of your premises, and don't allow theory to enter into it, but put it to the actual test, and find out whether compression properly used does not benefit the coal pile, save the engineer trouble, make the machine do better work, last longer, and a man need not write "professor" after his

name to determine these facts for himself in his own engine-room, to the satisfaction of his employer.

PILE DRIVING BY DYNAMITE.—According to Austrian accounts, some interesting experiments were recently made in connection with the execution of some municipal works at Buda-Pesth. It appears that a number of piles already driven were required to stand a greater load than had originally been contemplated, and it was consequently necessary to test them and drive those that yielded still deeper. Bringing a pile-driving machine successfully over each pile for so small an amount of work would necessarily have entailed considerable expense, and it was consequently determined to try the effect of dynamite. For this purpose the piles were cut square, and a wrought iron plate fifteen inches in diameter and four and three eighths inches thick was placed on the top of each. In the center of this plate, and immediately over that of the pile, was placed a charge of dynamite in the form of a cake six inches in diameter and three fourth inch thick, and weighing about seventeen and one half ounces. The dynamite was wrapped in parchment paper and covered with clay and ignited, and the effect so produced was found to be equal to about five blows from a 1,475 pound monkey falling from a height of about nine feet ten inches. The iron plates, it is said resisted from twenty to twenty-four explosions.

A NOVEL WAY OF BREAKING METAL.—An effective method of breaking up considerable pieces of iron and steel has come into use as a substitute for the process of melting them by means of colossal air furnaces—namely, the application of the force which confined water experts in every direction upon the material in which it is enclosed. A round hole, two or three inches in diameter and ten or twelve inches deep, is bored into the mass to be split, the hole being then filled with water and closed by a tight-fitting steel cylinder, upon which a weight is allowed to fall from the usual height. In this way, a plate roll of some thirty inches diameter has been split into four or five parts, the pieces flying twenty or thirty feet. A single blow of an ordinary drop weight usually suffices to split off pieces of thirty to thirty-six inches in diameter. It being essential that the hole be hermetically closed, this is accomplished by hollowing out the base of the cylinder into a cup-shaped form, the edges of which are driven against the walls of the hole by the water in its endeavor to get past. A pin of good steel can be used several times in this operation.—*St. Louis Republic.*

TALL CHIMNEYS.—The necessity of having tall chimney shafts is undoubtedly becoming obviated. We know that they are dangerous, and all are agreed that they are hideous architecturally, while recent practical experiments go a long way to show that, after all, short chimneys are not only less dangerous and in better taste, but that they effect a great saving. A new oven, which is described by a correspondent of the Yorkshire Post, would appear to render high chimneys quite unnecessary. Any manufacturer can, it seems, put an oven up at his works, and get from every ton of slack he uses coke worth 7s., tar and ammonia worth 4s., and 14,000 feet of gas to generate steam. The coke, tar, and ammonia will, it is said, considerably more than pay for slack, labor, wear and tear, and interest on the cost of the ovens, so that he will, according to this, actually get his steam for less than nothing. The smoke and vapors are claimed by the process to be all turned into money, instead of being wasted through a high chimney.

DANGEROUS PRACTICES.—F. B. Allen, in the *Locomotive*, says: When a boiler gives signs of distress, by unusual leaking, or by other well-known indications, it must at once and with the least possible disturbance be put out of service until it can be thoroughly examined by a competent inspector and the nature of the defect determined. The average water tender puts a heavy feed on the boiler and gets a ladder with which he may climb up and watch the spread of the leak. In opening the flue doors in the setting, to afford him the necessary view, unwittingly, no doubt, he permits a stream of cold air to sweep the boiler bottom, which adds another important element to its destruction, and perhaps his own. We would as soon think of entering a power magazine with a lighted cigar, as to do either of these things at the time or under the circumstances we have described.—*United States Miller.*

THE GJERS' SOAKING PIT.—According to present reports, Mr. Gjers' soaking pit continues to give excellent results in Great Britain. At the West Cumberland Iron and Steel Works, Workington, where the process is in full swing, 2,572 ingots, weighing 2,391 tons, were recently put through 14 soaking pits, yielding 2,176 tons of rails and 77 tons of blooms. The rail mill worked 11 shifts. The ingots put through the soaking pits were clogged direct from them to eight-inch blooms; they were then reheated and rolled into rails. Three second-heating furnaces were used, and the mill work was done with one cogging and one finishing engine.

SCIENTIFIC PROGRESS.

Science in Soap Bubbles.

The soap bubble has now come within the reach of science. By means of those gauzy globes many beautiful and interesting experiments have been made at the Franklin Institute during a lecture by Mr. B. S. Holman, actuary of the Institute, on "Some Effects of Light and Sound." The instruments used were the Holman lantern microscope and the same gentleman's later invention, the phonoscope, which may be translated into "seeing sound." The former instrument consists of a metal box containing an oxyhydrogen light, which is thrown at any angle by condensing lenses upon the object to be magnified. This light is reflected off at another angle through the magnifying lens on a screen, where the object is displayed greatly magnified.

The phonoscope consists of a thin metal tube, on one end of which is a thin cap in which a hole one inch square is cut, and at the other end is a large mouthpiece, such as is used on speaking tubes. The soap bubble preparation is composed of oleate of soda and glycerine, and from it bubbles two feet in diameter and of exceeding brilliancy can be blown. Some of these have been kept forty-eight hours under glass. The lecturer dipped the small end of the phonoscope into a saucer filled with this preparation, which left a film across the square opening. The cone of light from the lantern was then thrown upon the film and reflected upon a screen through the magnifying lens, making the figure about two feet square.

The effect was beautiful. At first nothing but a gray surface was seen, then gleams of color appeared, and in a moment the whole square was a mass of a dazzling brilliancy which would have put to shame any kaleidoscope ever made. Every instant the beautiful picture changed; now a wonderful design in reds and yellows, looking like a tea-store chromo of an Italian sunset, then shifting to a swarm of peacocks' tails, or a pantomime transformation scene struck by lightning and as suddenly changing to a somber view in blue and purple, or a rainbow dancing a waltz. After showing several of these pictures, the lecturer proceeded to show the effects of sound upon the soap bubble. A couplet was sung into the phonograph, the mouthpiece of which was placed against the mouthpiece of the phonoscope, and the crank was turned. As the sound issued forth, a curious effect was produced upon the picture. Geometrical figures in black appeared upon it, small and distinct when the notes were high, large and less clearly cut when the notes were low. Around and among the black figures whirled the ever changing colors, red, blue, green, yellow, in all their varying shades, melting into one another too quickly for their blending to be followed by the eye. Human voices, also, sang to the soap bubble, and with equally enriens results. It is proposed to exhibit this experiment on a very large scale as soon as the new lantern microscope, now being made for the institution, is finished.—*Philadelphia Record.*

SUN EXPLOSIONS.—A great deal of wonder has from time to time been excited by the statements of astronomers concerning the enormous velocity with which the matter forming the protuberances, or fiery fountains, seen on the edge of the sun during periods of the great solar disturbance, is shot upward from the general level of the photosphere. This velocity amounts in some cases, to several hundred miles a second. Now M. Paye, the French astronomer, who has been looked upon by some as a little too obstinate in rejecting certain conclusions about the sun which most astronomers have accepted, comes forward to combat the general opinion in regard to the formation of solar protuberances. He does not admit that the glowing gas forming the protuberances is hurled forth from the sun at the rate of 300 or 400 miles a second, and undertakes to explain how astronomers have been deceived. According to him, the gas in question, having risen above the level of the photosphere, expands and cools to such a degree as to become invisible. But at intervals the intense solar radiation heats this gas so that it becomes visible again. The heating begins from beneath and extends swiftly upward, thus producing the appearance of matter shot forth from the sun with tremendous velocity. It is hardly probable that this ingenious hypothesis will be fully accepted. While it may explain some of the appearances which have been noticed, it will be difficult to convince those who study the sun with the spectroscopic that gaseous matter is not at times hurled forth from the solar orb with the tremendous velocity before mentioned.

VIBRATIONS PRODUCED BY RAILWAYS TRAINS. Prof. H. M. Paul has communicated some interesting notes on the effect of railway trains in transmitting vibrations through the ground. A box, holding mercury thickened by amalgamation with tin, was placed upon a heavy plank screwed to the top of a post sunk four and a half feet into the ground. An express train, passing at a distance of one third of a mile, set the surface of the mercury in confused vibration for two or three minutes. Other observations were made at stations at somewhat greater distances. The experimenter also found that a one-horse vehicle passing down a gravelled road 400 or 500 feet distant caused a temporary agitation of the mercury whenever the wheels struck a small stone.

THERMAL BELTS OF NORTH CAROLINA.—In a paper on this topic, recently read by Prof. J. W. Chickering, it was stated that the valley of the Little Tennessee river, in Macon county, is about 2,000 feet above tide. When the thermometer indicates a temperature of about 26° F., the frost extends about 300 feet in vertical height up the mountain sides, and there ceases, appearing again 400 feet higher. In the intervening belt the most delicate plants remain untouched. Following a tributary stream upward from the valley, one passes three mountain barriers and enters in succession three valleys, the highest of which is plateau-like, and 3,900 feet in altitude. The vernal zone appears in each valley, rising as the valleys rise, but somewhat less rapidly, so that in the highest it is only 100 feet above the plateau. In this frostless zone the Isabella grape not merely has ripened for twenty-six consecutive years, but is free from mildew, blight and rust. In Polk county a similar belt is said to skirt the Tryon mountain, extending from 1,200 to 2,200 feet above tide. This is untouched by frost until the latter part of December, and is usually free from snow, while the mountains above and the valleys below are covered. The peculiar stratification of the air indicated by these statements merits scientific investigation.

HOW LONG IT TAKES TO SMELL.—Various delicate experiments have been made in order to determine the so-called "reaction time" in sensation—i. e., the time between the moment of excitation of the senses and the moment at which the person indicates by a signal that he has become conscious of the sensation. M. Beaunis, of Nancy, has recently sought to measure the reaction time for smell. He gives (*Comptes Rendus*) a table of the numbers obtained with ten substances; they range from thirty-seven hundredths of a second for ammonia, and forty-six for acetic acid, to sixty-three for mint, and sixty-seven for carbolic acid. In the case of musk, he was unable (notwithstanding repeated attempts) to fix precisely the moment of the smell sensation. The numbers given show that the reaction time for smelling is longer than that for touch, sight and hearing. (In the author's own case, it is shorter than for touch.) Dr. Baccola, of Turin, has recently made experiments on smell, with different apparatus, and gets results which agree in the main with those of M. Beaunis.

SOUNDS PRODUCED BY FLOW OF LIQUIDS.—Researches relating to sounds produced by a stream flowing through a circular hole at the lower end of a long tube containing liquid have shown that the pitch does not change gradually, but that a definite number of distinct notes are heard successively as the liquid column shortens by the outflow. The pitch depends on the length of the liquid column and on the velocity of efflux. The number of vibrations is proportional to the velocity of efflux, and the sound is pure only when the sound of the vein is one of the proper sounds of the liquid column. A column of constant length gives notes in a harmonic series. When the sound is reinforced by the column of air above, it becomes quite loud. If the walls of the tube are prevented from vibrating, the sound ceases. The relative velocity of sound in different liquids may be determined by finding the lengths of the columns of liquid which give the same note, and the results thus obtained will be found to agree very well with determinations by other methods.

MORE ELECTRICAL EXPERIMENTS ON VEGETATION.—M. Macagno has experimented near Palermo upon the influence of atmospheric electricity on the growth of grape vines. Sixteen feet were submitted to the action of an electric current, by means of a copper wire inserted by a platinum point in the extremity of a fruit-bearing branch, while another wire connected the branch at its origin with the soil. The experiment lasted from April to September. The wood of the branches which were experimented upon, contained less potash and other mineral matters than the rest of the vine, but the leaves had an excess of potash under the form of bitartrate; the grapes collected from the electrified branches furnished more must, contained more glucose and were less acid.

A NEW EXPLOSIVE.—The Nihilists are reported to be considerably interested in a new explosive that is making quite a stir in Europe. It is the invention of Eugene Turpin, and glories in the name of "panclastite" or "brise-tout." It is said to be composed of two liquids, each non-explosive when alone, but when mixed together, just as wine and water are mixed, a fulminating compound is produced which can be exploded either by ignition or percussion. Experiments made at Cherbourg by the iron plate and the lead cylinder tests showed it to be much more powerful than dynamite, while by trial it was shown to be much less sensitive to a blow.

AN ANCIENT PERUVIAN BRONZE CHISEL.—At the meeting of the French Academy of Science on February 6th, M. Boussingault submitted to the members a bronze chisel harder than copper and not so hard as iron, composed of 95 copper, 4.5 tin, and traces of lead and silver. It is a specimen of the metallurgy of the Incas before their conquest by Spain, and has served to work the stone of Peru. It was found on the high-road between Quito and Cuzco. As to the supposed hardening that was given to bronze, M. Boussingault declared that he knew nothing of it, and had never been able to produce it.

SIERRA CITY.—*Mt. Messenger*, April 19: Considerable fine gold is still found in the top gravel of the One Thousand and One and Blue Gravel claims and the work of development energetically progresses.

Interest in quartz is beginning to revive in this section. The surprisingly large returns from the Marguerita, especially the latest clean up of \$25,000 for only a run of 28 days, conclusively proves to an unprejudiced mind, that the mineral resources of Sierra have been but partially developed. The Colombo ledge now bonded to Boston capitalists, must undoubtedly be as valuable property, if the rich quartz specimens, from the croppings, shown me, are a fair criterion. If but a very small proportion of the millions so lavishly expended on the Comstock, had been judiciously invested to unlock the golden vaults of these mountains of untold wealth of the Sierra Nevada, our deep, river canyons would be lined with quartz mills and the most prosperous mining camps in the world.

BRANDY CITY.—Sierra Tribune, April 19: The mining companies of this camp are taking advantage of the water season and sending down the debris to enrich the adobe soil of the foot-hills, which otherwise would be of little value for agricultural purposes, notwithstanding much has been said in regard to destroying that valuable branch of our industry. The Brandy City Co. has sufficient water for all purposes at present, although the ground is not of the richest kind. The company keeps washing away and has a force of about 40 men employed. This company wishes to let contract for running a bed-rock tunnel to that portion of their ground called the Windyvale claims, which is considered rich ground, and if once opened up would greatly enhance the value of their property. The Amott is likewise being worked this season, though the company is under the necessity of purchasing water. The claims will in all probability be worked out in about two years, provided they have water to work them. The Grizzly Hill mine owned by the Sharpe Bros., and on which they have bestowed their labor for over 20 years, is now in a favorable condition for working, although water is scarce within this year; yet the gravel they are piping away being on the bed-rock and void of clay pipe, they may clean up pretty well this season; for the time they may be employed washing. Their force is small, but only six men.

Trinity.
MINING OUTLOOK.—Trinity Journal, April 21: In view of the many nice showings which have visited this section with the past month, our people are greatly inclined to forgive the clerk of the weather for his apparent neglect during the winter. One month ago the mining outlook at this place was worse than had ever before been known, almost the last hope had departed and even the most sanguine felt certain that only a total failure could result from the unprecedented dry winter through which we had passed. Comparatively speaking, no work had been done in the hydraulic mines up to the first of April, and until the storms began a week before, it seemed more than probable that very little would be done after that date. However the storms have come liberally and in the best of order ever since they began on the 25th ultimo, and since the opening of the present month mines have been constantly employed in active operations. It does not now seem like predicting too much to say that the chances are good for three months sluicing; expenses for all hands are assured and to most of the owners of hydraulic mines the chances of a reasonable surplus on the season's work are more than good. The days are now long and freezing weather is past, so that nothing interferes with the free flow of water and the prosecution of work in the mines to the best advantage.

Tuolumne.
LAMPHEAR.—Union Democrat, April 21: Work under the new ownership of the Lamphear mine, has developed a vein 7 ft thick which shows gold generously. More than 50 tons of high grade ore was taken out in working up to trace the vein which does not crop out, or come to the surface. It is believed to be equally as rich as the Confidence mine proved some years ago.

NEVADA.
Washoe District.
UNION CON.—Enterprise, April 21: The joint Mexican east crosscut on the 2500 level shows but little change.

MEXICAN.—The joint Union Con. east crosscut on the 2500 level is still finding stringers of quartz of good appearance, but of low grade.

HALE & NORCROSS.—The drift on the 2600 level was extended south 65 ft, and developed some excellent ore, the average assays being over \$70. A drift has now been started north, and the ore streaks are looking well in that direction. The indications are that the ore is making in that direction.

OPHIR.—The joint Mexican east crosscut from the 300 station has passed through the belt of black porphyry which forms a kind of horse in the vein, and has now entered the usual channel of vein material.

POTOSI.—Some pretty fair assays have been obtained in drilling, but a good deal of water has been tapped and it has been necessary to plug up the holes. In crosscutting the indications are that good ore will be found at some point, as the ground is found to be fertile.

CALIFORNIA.—Sinking has been resumed in the C. & C. winze, which will be put down to the 2500 and connected with the main shaft drift.

CON. VIRGINIA.—The southeast drift on the 2500 level is exceedingly hot.

YELLOW JACKET.—The yield of ore from the 2d, 3d, 4th and 5th levels amounts to about 150 tons per day. The ground continues to look well.

CHOLLAR.—West crosscut No 2 has passed through some very favorable ground, and has cut several stringers of quartz of considerable width.

Bullion District.
ORE.—Austin Democrat, April 19: Mr. Robinson, who has been superintendent of the Bullion mine, 20 miles south of Beowawe, makes a flattering statement of the outlook of the district. He says there is ore enough to run a 10-stamp mill for a year. The old mill they have now is all worn out, and the roaster is old style and useless. A new ro-stamp mill and truckner furnace will be put up soon, and money made. The mine is owned by Dr. Frisbie, of Vallejo, L. Radovich, of San Francisco, and W. H. Ducommun and Lorey, who reside on the ground. There are many good prospects in Nevada, and every one will help make better times. The same company owns the Lady of the Lake and the Ivanhoe. Both have good ore, worth from \$100 up. A mile west of the mill is the Silverside, owned by Jas.

Campbell, with ore going from \$75 to \$900 a ton. There are lead ores nine miles further up the hill, owned by Twist brothers and Hoskins brothers. They ship ore to Salt Lake.

Columbus District.
NORTHERN BELLE.—Candelaria Free Press, April 20: The drift below the fifth shaft level has been advanced ten feet during the week, without developing any change in the formation. It is now in a total distance of 80 feet. A crosscut will be started east from the end of this drift to prospect the foot wall of the ledge. All the work in and about the mine is progressing in a satisfactory manner, the daily output of ore being about 55 tons. Both mills are running steadily, and doing good work. Five stamps of mill No. 2 have been engaged part of the week crushing a quantity of ore from the Great Western mine in Garfield district. The shipments of bullion have been \$22,642.51 for the week ending April 19th, and aggregate \$99,882.13 on April account to the same date.

MOUNT DIAMOND.—A little 500 ore is being extracted from the east drift on the second level, and the slope from the raise north of the shaft, on the second level, is yielding considerable \$75 ore. The west slope from the west drift from the Callison winze, shows two feet of ore assaying \$65 per ton, the one to the east has encountered 12 inches of \$90 ore. A small amount of \$100 ore is being taken from a point near the shaft on the first level. A shipment of bullion amounting to \$6,286.48 was made on the 12th inst., and another of \$8,759.22 on the 17th.

Comet District.
THREE PROSPECTS.—Pioche Record, April 19: Comet district mines are developing nicely. When a district can exhibit three good prospects, showing good quantities of fine pay ore, there are certainly good hopes for it, no matter what the formation of the district may be.

Florence District.
RATTLENAKE CANON.—Belmont Courier, April 14: From Charles B. Streicher we learn that the work of development is pushed constantly in the Sedan mine at Rattlesnake canyon, this county. The shaft has attained a depth of 130 ft, at the bottom of which the ledge is 4½ ft wide and still widening, as they go down. Assays made of the ore extracted from this ledge give as high as \$41 in gold and \$100 in silver. The ore will mill, on an average, between \$50 and \$60 to the ton. This is thought to be one of the very best properties in Florence district. Our townsman, Henry Bohle, is one of the owners.

Galena District.
A RICH STRIKE IN GALENA.—Eureka Sentinel, April 20: A rich strike was made in the McEwen mine, Galena, last Saturday, by the miners working in the main tunnel. The face of the tunnel is nearly all ore, and about 3 ft of it very rich. Persons who have seen the bonanza say that it is the richest prospect they have ever seen. The tunnel is now in nearly 1,000 ft; well timbered where necessary; with a good track and cars; but little water to retard operations, and the ground is easily prospected. About 135 ft of ledge carrying rich galena ore is exposed in the tunnel, which, at the present face, is about 200 ft in depth from the surface, giving a fine back for a slope. The full extent of the new find cannot be estimated at present, but it should certainly cause a stir in the camp and be the means of inducing those interested in mines to thoroughly prospect their claims. The McEwen mine is owned by Messrs. Blossom and Foster. These gentlemen have expended considerable capital in opening up their mine, and now will be amply repaid for their expenditures.

Jackrabbit District.
PROMISING.—Pioche Record, April 19: Some very nice looking samples of ore were brought to town from the King Fisher claim, Jackrabbit district, owned by Russell Fuller, Bailey Wilcox and J. C. Lynch. This claim is said to be the most promising in the district.

Lewis District.
THE BETTY O'NEAL ATTACHED.—Silver State, April 20: The Betty O'Neal mine, at Lewis, has been attached by creditors. Two of our lawyers, Judge Bonfield and J. H. MacMillan, have been up there attending to the interests of their clients, who are creditors of the company. The Anglo-Californian bank, of San Francisco, and Frank Watts and John Dias, of Lewis, are the principal creditors. The total amount for which the property has been attached is about \$8,000. This is bad for northern Lander.

Mount Cory District.
REDUCTION WORKS.—Walker Lake Bulletin, April 20: The Mount Cory Co. has decided upon the erection of reduction works, and is only awaiting the result of experiments to determine which will be the cheapest method. It is, however, generally understood that a mill will be built somewhere up the canyon for working such ore as can be worked by mill process, and that, in a few months, one of the several styles of furnaces will be built near Hawthorne, for working the refractory ore of the Mount Cory mine and base ores from other districts in the neighborhood.

Tuscarora District.
BELLE ISLE.—Times-Review, April 19: During past week drift No. 1 has been advanced 10 ft and drift No. 3, 15 ft, with no change to note.

NORTH BELLE ISLE.—During the past week the south drift has been advanced 18 ft. East crosscut advanced 12 ft and north drift 15 ft.

INDEPENDENCE.—During the past week the south drift, 400 level, has been advanced 17 ft, making a total distance of 534 ft.

ARGENTA.—Getting ready to slope above the 700 level next week.

GRAND PRIZE.—Water is gradually decreasing in it. West drift on the hanging wall on the 500 level is in 30 ft; vein is small; ore is good. Have commenced sloping ore above the 500 level.

NAVAJO.—The drift on the 450 level has been advanced 14 ft during the past week, and the east lateral drift, 350 level, was advanced 15 ft, with no change to note.

ELKO CON.—The ledge continues to look very encouraging and steadily improves as the drift is advanced. During the last few feet a stratum of blue kidney rock has been encountered, and looks very promising.

Tybo District.
PROGRESSING.—Belmont Courier, April 14: Work progresses satisfactorily in the 2½ mine at Tybo. We are reliably informed that large bodies of ore are exposed in this mine, enough, in fact, to run the company's 20-stamp mill for two years. It has never been disputed that rich mines exist in Tybo district, and, as soon as a railroad runs through that section, things will boom there. J. A. Donnel, of Tybo, informs us that the mine owned by himself and J. D. Page, an extension of the 2½, is looking uptop. These enterprising gentlemen have expended a considerable amount of money in developing this property, and there is no doubt that, in the near future, they will be richly rewarded for their pluck and energy.

ARIZONA.
BLACK HILLS MINING DISTRICT.—Prescott Courier, April 19: E. F. Thomas will start for this district to-day. C. B. Foster will accompany him. With them will go men who will at once commence opening roads, preparing sites for furnaces, etc. Mr. Foster will lay off the routes for roads. Mr. Thomas will act as general superintendent of the United Verde Copper M. Co., which company will shortly have 90 men at work. Wm. M. Butum, one of our oldest merchants, will very soon have a store filled with goods in the district.

YAVAPI MINES.—Prescott Courier, April 20: Prof. Geo. A. Treadwell, who is engineering the sale of C. C. Bean's magnificent copper properties, arrived from Mexico and southern Arizona a couple of days ago, and will remain in Prescott until Mr. Williams, of the Copper Queen mine, and a New York gentleman arrive here, when all will visit Mr. Bean's mines, which are, we learn, looking much better than when Mr. Treadwell last visited them, which change is, of course, due to the fact that, like most Yavapai county mines, the farther from the surface the richer the mine. The strike of rich gold rock in the Belle mine is what pleases members of the Howell company and all friends of this section. Gov. Tittle and his people have so far been very successful in securing means to develop Black Hills district. C. C. Bean proposes to do a great deal of mining in this vicinity as soon as that English company takes hold of his copper properties. One little job he proposes having done, is that of tunneling through and through Quartz mountain.

FOR WATER.—Pinal Drill, April 21: The work of sinking for water at the Queen Creek smelter is going on. The well is now 60 ft deep in solid clay almost impermeable to water. The sinking will continue until water is reached. As soon as that is obtained we expect that everything else will be in readiness for work.

MINERAL HILL DISTRICT.—Pinal Drill, April 21: We are informed that the Wide Awake M. Co. intend to renew the work on the Gem mine. It is also stated that work will be started on the Alice, in Mineral Hill district. Several other mines that have taken a rest are about to recommence their rustle, so that we expect lively times in Pioneer district this coming season.

RODGERS DISTRICT.—Pinal Drill, April 21: Messrs. Broerman & Sessler, of the World Benter, paid us a visit. They are working on their mine, extracting high grade ore, to be shipped and sold to the best advantage. They find their ore very profitable, and will probably make arrangements with some of the parties who are now contemplating the erection of smelting works in Rodgers district. W. T. Hutchinson has engaged Santos Corona, the experienced Mexican smelter, to erect one or more furnaces in Rodgers' district. This enterprise, if successful, will materially aid the mines in that vicinity, inasmuch as the transportation of ore for several miles must be by packing and a system of concentration of ore that will lower the freight. Rodgers' district is very favorable for smelting furnaces, there being timber in abundance for charcoal.

IDAHO.

ATLANTA MINES.—Idaho Statesman, April 20: The rich mining district of which Atlanta is the center is now on the eve of a grand boom, both in the extent of mining operations and results. The Monarch Company have their fine hoisting works in successful operation, and are pushing their main shaft with a strong force. Their hoisting machinery, both for capacity and completeness, is fully equal to any now in operation in Idaho or elsewhere. The Tahoma Co., whose mine is now well opened and ready to furnish ore to any extent, will have their crushing and reduction works in full blast as soon as the roads will permit the machinery to be brought in and put up. Other fine properties about Atlanta are in good working condition, and everything promises the most successful season the camp has ever experienced. The only drawback to the rapid development of the camp and to a rich yield of bullion has been and yet is, the isolated and almost inaccessible position of the camp, surrounded as it is on all sides but one by high and rugged mountains.

THE EAST FORK.—Wood River Times, April 18: Richard Lord, of Lord & Domski, has just returned from the East Fork of Wood River, and shows some remarkably rich ore from a ledge just discovered there by himself, near the Ben, Hauler group. One streak in the vein gives ore assaying \$1,400 per ton. He has come to town to settle his claim, and will take measures for its development without delay. He states that a number of the owners of claims on East Fork are arriving there and starting work on their properties, and a number of others are looked for daily. Superintendent Rogers, with 12 miners had arrived there and resumed work upon the Paymaster group, which is owned by the Philadelphia Co. New buildings will be erected, and work pushed ahead there, as well as at all of the camps.

MONTANA.

THE GAGNON.—Butte Miner, April 18: Among the few mines, in this or any other district, which have been operated at a profit, almost from the grass roots down, is the Gagnon, and the remark has not infrequently been made regarding this mine, that when the ore bodies on the surface were worked out there would be no mine left, but Col. J. C. Thornton, the efficient superintendent, thought different, and his confidence in the true fissure veins which had been developed under his own supervision in the mine was so great that he became the principal if not the sole owner of the property, and immediately thereafter began to sink for lower levels. In the west drift from the 400-ft station a fine vein of

high-grade ore was struck, which has proved something of a bonanza for the Colonel. Recently a 500-ft station, which is really 515 ft below the surface, has been opened and south and west drifts been run. The latter has tapped the vein which was developed in the 400, and ore is being extracted which runs \$300 to \$400 per ton. A winze has been started on the vein from the 400 to the 500, and developments from day to day confirm the existence of one of the greatest ore bodies ever uncovered in the district, which improves in size and grade with depth. This mine will be thoroughly developed below the 500, and is likely to be the first in the camp to demonstrate by deep mining the fact that our true fissure veins may be relied upon at a lower depth than has yet been explored.

STARTING UP THE BELL.—Butte Miner, April 20: The Bell smelter will be steamed up to-day and the machinery tested. If everything is found to work well, the smelter will be started up to-morrow morning on the ore already on the dump. The ore on hand is sufficient for 60 days run, by which time it is expected connection will be made between the new shaft and the old workings at the mine, which will furnish a regular ore supply for the future. When the smelter starts up to-day the fact will be announced by the blowing of the whistle at the Bell smelter, and other works will join in the chorus. The event is a notable one, and the shrill shrieking of a hundred steam whistles this afternoon will be a melodious sound to the ears of the entire community.

PHILLIPSBURG. James Burk, of the Salmon mine, at Phillipsburg, is spending a few days in the city. He reports the mines at the pioneer camp looking well, everybody is anticipating a good season, and claim owners are doing a good deal of representation work. People who own claims on Granite Mountain have a good thing and propose to hold it. The Granite Mountain and Hope mines are working full forces of men and hoisting plenty of ore. The Hope mill has been making a steady run, but has shut down for a few days to clean up and make necessary repairs.

NEW MEXICO.

SANTA RITA.—New Southwest, April 20: The San Jose Smelting Co. has purchased the coke held on hand by the Santa Rita people; a fair evidence that the Santa Rita is not to be started up an early day.

THE ore belts only have so far been developed in the Santa Rita property; others doubtless exist, and further exploration work will unquestionably disclose their location.

LOW GRADE ORE.—Between Bullard's peak and the Gila the country is covered with immense leads of low grade galena and carbonate ore. One mine recently located has a 35-ft vein of carbonate ore; many other leads averaging from 15 to 15 ft in width. The claims run very high in lead but carry little silver.

THE Hermosa, on Monument creek, is being worked by its owners, Messrs. Holmes, Holt and Deimer. They are now down 70 or 80 ft in a shaft, and have a good-sized engine of mineral which runs, on an average, \$160 in silver. The ore is a bonanza, very much like that of the Silver Monument, and the mineral streak which, on the surface, was only a few inches wide, has been constantly widening all the way down.

UTAH.

DEEP CREEK.—Salt Lake Tribune, April 20: The Deep Creek country gives promise of becoming a good mining district. During the past but little has been done there except to stake out a few claims and then neglect them. The distance from transportation, the difficulty of getting in supplies, the sparsely settled condition of the country and lack of capital have prevented progress there. Some months ago N. C. Springer went to that district and secured some prospects, which he deems so good that he came home and made preparations to go there and spend the summer in working them. He brought eight large teams from his ranch in Summit county to this city, and will load them to-day with six or eight tons of machinery, and with three tons of supplies, and full outfit for Deep Creek. The machinery will at once be put in operation, and the teams will be used for taking in supplies and hauling out ore. It is nearly one hundred miles from the mines to the nearest railway station on the Central Pacific, to which point he proposes to take his ore, thence to be shipped to this city.

The Mining and Scientific Press.

The miners of this coast have now known the MINING AND SCIENTIFIC PRESS so many years that it is scarcely worth while to call their attention to its important features, which are valuable to them in their calling. Yet there are many new comers who should take the paper who may not be familiar with it, and we hope our old readers will bring it to their attention.

We give every week a condensed summary of the current mining news, a condensed account of all that is new in science or mechanics, correspondence on suitable topics from all parts of the coast, illustrations of all the new improved machinery, especially that applicable to mining and metallurgy, timely editorials on topics suitable to a technical journal, metal markets, etc.

The Press is eminently practical, and we publish the results of experience as fast as it is gathered. In the matter of describing new mining appliances, inventions, metallurgical processes, etc., the Press stands alone. No man interested in mining matters can afford to be without it. When new districts are discovered we present maps and descriptions and collate from every source all that will be useful to our readers. Any reader looking over this number of the Press will see how useful such a journal will be to him in his business.

Latest Instructions to Settlers upon the Public Domain.

(CONTINUED FROM PAGE 282.)

than five years; and shall, moreover, thereafter be incapable of giving testimony in any court of the United States until such time as the judgment against him is reversed.

Sec. 5393. Every person who procures another to commit any perjury is guilty of subornation of perjury, and punishable as in the preceding section prescribed.

Sec. 5440. If two or more persons conspire either to commit an offense against the United States, or to defraud the United States in any manner or for any purpose, and one or more of such parties do any act to effect the object of the conspiracy, all the parties to such conspiracy shall be liable to a penalty of not less than \$1,000, and not more than \$10,000, and to imprisonment not more than two years.

Sec. 5479. If any person shall falsely make, alter, forge, or counterfeit, or cause or procure to be falsely made, altered, forged, or counterfeited, or willingly aid or assist in the false making, altering, forging, or counterfeiting, any bond, bid, proposal, guarantee, security, official bond, public record, affidavit, or other writing, for the purpose of defrauding the United States,

San Francisco.

As San Francisco is the great center and distributing point of the Pacific coast, we deem it appropriate to an issue devoted to immigration matters to present a view of the city whence nearly all new comers come before selecting their future locations. The view is taken from an imaginary point northeast of the city.

San Francisco is the youngest of America's great cities. The exact date of settlement or founding may be claimed for the time when the site of the Mission was first selected by Portala and Crespi, in 1769, or when the Mission and Presidio were established by the good friars, Palou and Cambon, in 1776; or when Richardson, in 1835, located here and established a trading post, calling the place Yerba Buena; or when Visoet, in 1839, surveyed the ground into streets and squares; or when, in 1847, the Americans in possession resurveyed and enlarged the area, and gave it the name of San Francisco. A mediæval obscurity surrounds its early settlement and progress. The religious spirit of the middle ages, even to a late date in the eighteenth century, still governing the Spanish people, prompted its devotees to penetrate the wild regions of the new world, to spread the doctrines of the church and gather

cisco may be regarded as the objective point of all railroads of the Pacific coast, but more particularly so of all in California. The city is fixed as the natural center of commerce of the whole west coast of North America. The great rivers, valleys and mountain passes lead unerringly to this point, and thus converge the channels of inland trade from all the surrounding States and Territories. The broad bay affords one of the best harbors of the world, and the Golden Gate opens to the Pacific and all the maritime nations of the earth. The currents of the air and the ocean so aid the other advantages, that the location is perfected as a center of commerce. The conditions of location and climate insure to San Francisco a higher degree of health and exemption from known epidemics than is vouchsafed to most other large cities of the world. Situated upon a narrow, rocky and hilly peninsula, with the broad Pacific on the west, and the capacious bay and straits of Golden Gate on the east and north, with their swiftly flowing tides, keep its surroundings washed and pure, while the prevailing winds, through the warm, dry summer pour freely upon it from their long sweep over the ocean where they have gathered the elements of health, uncontaminated by the malaria of dying vegetation or the miasmatic poisons of inhabited lands. Nature having

ores thousands of miles by wagon and rail to eastern works after we have failed in the profitable working at home. The Colorado idea is one which should commend itself to the mine owners and capitalists of the county as the only feasible solution of the question of economical treatment of ores, and should be adopted to the entire exclusion of the monumental folly that would fill our gulches with worthless cast iron rattletraps in no way fitted to perform the duties required of them. We believe the Howell works, on Lynx creek, a right step in the proper direction, but as the capacity of even Mr. Howell's extensive plant is not sufficient for the requirements of this section, we hope to see similar other enterprises started in the heart of the rich mining country south of Prescott.—*Cor. Prescott Courier.*

Walnut Grove Mining District.

Mr. Moroney tells us that John Tiedman and a man named Johnson recently found a ledge which prospects well in gold. It is situated about two miles east of Callen's camp at the Piaceritas. The finders are at work sinking a shaft.

Yarnell and Sistro are taking rich gold rock from a mine near the Vesnivins.

Sanchez, who has been getting \$1,000 a month



BIRD'S-EYE VIEW OF SAN FRANCISCO.

or shall utter or publish as true, or cause to be uttered or published as true, any such false, forged, altered, or counterfeited bond, bid, proposal, guarantee, security, official bond, public record, affidavit, or other writing, for the purpose of defrauding the United States, knowing the same to be false, forged, altered, or counterfeited, or shall transmit to, or present at, or cause or procure to be transmitted to, or presented at, the office of any officer of the United States, any such false, forged, altered, or counterfeited bond, bid, proposal, guarantee, security, official bond, public record, affidavit, or other writing, knowing the same to be false, forged, altered, or counterfeited for the purpose of defrauding the United States, shall be punishable by a fine of not more than \$1,000, or by imprisonment at hard labor for not more than ten years, or by both such punishments.

LA ROSE DAVELTY has given the Lamphere mine at Confidence to Johnnie Davis & Co., in consideration that the company will give him the contract for furnishing poles, etc., for the mine when operations shall have commenced. La Rose, who is a grocer in the locality, argued that the mine would probably never be opened by himself, and if there was anything in it, it had better be taken out and circulated.—*Tholomine Independent.*

It is reported that ex-Governor Blasdel has sold the Humboldt group of mines at Aurora for \$150,000.

the heathen under its care, rather than to enlarge the sphere of human liberties, or pursue wealth by extending commerce or developing the resources of the country.

Under such auspices was the site of the city selected and occupied, thus giving in the brief period of a century an ancient character to its history, advancing with a bound as it sprang from Spanish to American rule—from the semi-civilized past to the enlightenment and activity of modern times. The peculiar features of the city were not obliterated by the change. Ancient and simple as it was in its origin, it has become the most busy and cosmopolitan of the age. Every State of the Union has its representative, and from every quarter of the globe have come its citizens: the language of every commercial people is spoken; every color which the human visage bears is seen, and every religion has its worshippers. These characteristics of cosmopolitanism distinguish the modern city from its sisters as did its mediæval features of early years from the settlements of the Atlantic coast.

In April, 1856, the limits of the present city's territory were fixed by law. The southern boundary is the U. S. land survey of the line separating townships two and three south of Mt. Diablo base and meridian. The Farallone, Angel, Alcatraz and Goat islands are included in San Francisco city and county. The boundaries are the Golden Gate on the north, the Bay of San Francisco on the east, San Mateo county on the south, and the Pacific ocean on the west. The land area is 42 square miles, or 26,880 acres. San Fran-

thus provided, it has been easy to preserve a high order of health; and indeed it were criminal in the extreme, and a blot upon our boasted civilization, should our city show a large percentage of mortality or excessive sickness.

Ore Veins and Reduction Works.

The experience of mining communities elsewhere goes to further the opinion that mining and milling operations are best conducted where they are not combined under a single management. The practice of locating small mills on single claims is rapidly giving way to that of having larger and more complete mills erected at central points, to which the product of many mines are made to contribute. This is eminently the Colorado idea and is the natural outgrowth of rebellious ores and rich but small veins. The cost of transporting ores to such mills and reduction works is more than offset, in most cases, by the larger percentage of the precious metals saved under superior management, costlier appliances and the superior facilities of these large works. It is one of the very palpable causes of failure in mining enterprises in Yavapai county in the past, that neither the money nor experience of certain mine owners who essayed the treatment of their ores at the mines were adequate to the attainment of even fair results. The character of our ores is such that only expensive appliances can successfully and economically treat them, and we have the example presented to us of shipments of ou-

in his arastras, has sold one half interest in his properties.

Chispas, weighing from one dollar to sixty dollars, have, of late, been found in the gravel and on the slate bedrock. When the Mulvane ladies, of Kansas, were at the diggings with their husbands, they washed out considerable gold, a fact which pleased them very much.

A new ten-stamp mill, built in Denver, Colorado, is on the ground and will be up and running inside of ninety days. Each stamp weighs 600 pounds. The engine is a twenty-five horse power, Westinghouse; the mortar is different from the California mortars and, it is thought, far better. Mr. Bolthoff, firm of Bolthoff & Hendrie, of Denver, which firm makes these mills, will come down and superintend its erection. With it came timbers, etc., all ready for the machinery.

These mines—quartz and placer—of the Callen company, are between Peoples Valley and Walnut Grove, where, besides mineral, wood, water and grass are abundant.

It is the opinion of old and new settlers who know the section and its resources that the company can, if they work things rightly, amass large fortunes out of the mines now owned by them.—*Prescott Courier.*

A PUMP in the Grand Central mine at Tombstone is successfully at work, and it will soon be demonstrated whether ore deposits exist below the water line in that region.

Walker Mining District, Arizona.

The above named mining district is in Yavapai county, between ten and twelve miles from Prescott, in a southeasterly direction. To get there by wagon, a person goes north, a little over a mile, via Whipple Barracks, thence east to Lynx creek, the general course of which stream is followed to the Howell Quartz Reduction works, around which now congregate a great many busy people.

Another way, and a shorter one to get there, is by the trail which crosses Banning and Groom creeks. This is the shortest way. Juniper, oak and pine trees are plentiful on both routes, as are water and grass. The altitude of the region, from 5,500 to 7,000 feet above the level of the sea, the ever circulating breezes, mostly from the south, make it a very healthy region. Water is always cool and pure. From the high mountain peaks around the smelter, a person can gaze upon what may be termed a sea of pine, beyond which are charming valleys, where people who raise supplies for the miners dwell in peace and have plenty of the world's good things. In 1862, when the late Capt. Joe Walker led the first party of prospectors and miners into this part of the territory, they selected Walker district as the best place for their operations. The woods were well stocked with bear, deer, turkey and other game; the gravel of the creeks was well charged with gold, in small and large particles, while quartz ledges, carrying gold, silver, lead and other metals were to be seen on every hand.

Taking the whip saws which the party had brought with them, lumber for rockers and shies were easily made out of the grand pine trees of the district, claims were staked off, log cabins erected and the work of gold getting commenced. The diggings paid well for the most primitive kind of mining; gold dust was in every man's pocket and cabin, and no fault was found with the country. Miners flocked in from California, Colorado and other places. While there was but little of the law that is known in so-called civilized regions, our pioneers attended to their business, order reigned and nothing occurred to make anybody afraid until neighboring Indians commenced to keep aloof from the miners, to look ugly and threatening. The adventurers had treated the aborigines well; they shared with them their provisions, clothing and tobacco; but savage nature wanted more; they commenced to steal horses, mules and donkeys from the miners and to lay in ambush and kill them. This was the way trouble started in the first settlement made by Americans in central Arizona. This was when it became exceedingly disagreeable for white men to reside here. A great many fell by the wayside; those who survived held the country "by the skin of their teeth," as the saying goes.

The richest of the placer mines were soon worked out, and the great cost of the necessities of life, together with the Indians, deterred many men from attacking poor diggings with pick and shovel. So population kept decreasing until what was once the largest mining camp in Arizona, became a very insignificant one.

Attempts were at various times made to work the quartz by mill and arrastra process. Some men were very successful, but as depth was attained sulphurets became thick and the miners were not, of course, fixed with machinery for the treatment of the "rebellious" particles.

The Howell Milling, Mining and Smelting Company have, at great expense, prepared themselves with machinery to treat all classes of ore; they have infused new life in Walker and adjacent mining districts and will, we believe, solve the grand problem which has so long bothered old Hassayamplers—"Can sulphurets be worked with profit?"

Having recently sent William S. Hodges, one of our young men, over to the Howell camp, we below give the result of his observations in his own language:

A visit to Lynx creek will convince anybody of the future prosperity of the district.

Howell Smelting Works.

In company with Mr. Geo. B. Schoonmaker, who is connected with the Howell Mining, Milling and Smelting company, we visited the works and through his courtesy, obtained the following information concerning them:

There was about \$50,000 worth of crushed ore on the dump, most of it paid for, representing fifteen mines. Among them are the Happy Jack, Dosoris, Kittie, Middleton and Silver Belt. The crusher, roaster and saw-mill are running daily; in the cooling room there are about sixty tons of roasted ore, ready for smelting. The smelter will commence its operations in about thirty days. The company also has about 25,000 bushels of charcoal burned and burning, besides several thousand cords of wood; the saw-mill has sawed 200,000 feet of lumber since it started. The company has a stamp mill and concentrator on the way.

Col. C. C. Lane, the company's secretary, is in the camp. Some of the directors are expected to arrive in a few days.

The company have built good wagon roads to their mines. Their teams make daily trips and bring in from ten to twelve tons of ore per day.

Three pack trains of about twenty mules and burros each, make two trips daily to the Kittie, Silver Belt, Dosoris and other mines in the district.—Prescott Courier.

USEFUL INFORMATION.

Crackled Glass.

The *Moniteur de la Ceramique* gives the following description of Bay's process for making the new kind of glass, which is smooth on one side and rough on the other. The roughened surface of the glass looks as if it was covered with cracks, and this appearance is obtained by spreading over the surface of the glass a thick layer of some flux, or easily fusible glass, that has been made fluid or pasty and mixed with coarser pieces. The glass is then put in a mill or an open furnace and strongly heated. As soon as this flux is melted and the glass itself becomes red hot, it is taken out of the furnace and rapidly cooled. This flux or fused glass then cracks off from the other glass which was attacked by it, leaving numerous depressions in the latter resembling scales and irregular crystalline forms, crossing and intersecting each other and producing very beautiful effects when the light falls upon it. This fusible layer is cooled as rapidly as possible, either by a current of cold air, or by carefully sprinkling with cold water.

If some portions of the glass are protected from the action of the flux, the surface remains smooth, there is a striking contrast to the crackled portion. This can be utilized in making arabesque, letters, and other designs on a white or colored ground.

A similar crackled glass is made in another way, by strewing a coarsely grained flux on a cylinder of glass while still red hot, and then putting it back in the heating furnace until the flux melts. It is then rapidly cooled, either by sprinkling water on it or waving it back and forth. The layer of melted flux then cracks off and exposes the surface of the glass which has been corroded by it. The cylinder is then cut and spread out in the usual manner.

BEST TIME TO CUT TIMBER.—A correspondent of an Eastern journal says: "For strength, beauty and durability I have found August, September and October the best, and February, March and April the worst months to cut wood. A red maple cut in September will keep in a round log perfectly white and sound until the next August; while one cut in March will begin to blacken and decay by the middle or last of June. This is not copied from any scientific work, but is what I have found to be a fact by many practical tests. Gray birch cut in September will keep in a good condition until the next September if left in the woods cut in four foot lengths; while if cut in March and left in the same way it will be nearly worthless by the first of August; at least such is the result on my land. White pine, like the red maple, keeps white much longer if cut in September than if cut in March, and is not injured by the worms as much. I have found that wood dried slowly in a low cool place is better than dried quickly in the hot sun, even though cut in summer. May this not, in a measure, account for wood being better cut in autumn, it having the long cold winter to dry in?"

CELLULOSE TO BE SUPERSEDED.—A new material has been invented, which, according to the *Tradesman*, it is thought will supersede celluloid. It possesses all the hardness and brilliancy of the latter, and has the advantage of being fire-proof. It is made in this way: A solution is prepared of 200 parts of casein in 50 parts of ammonia and 400 of water, or 150 parts of albumen in 400 parts of water. To the solution the following are added: Quick lime, 240 parts; acetate of alumina, 150 parts; alum, 50 parts; sulphate of lime, 1,200 parts; oil, 100 parts. The oil is to be mixed in the last. When dark objects are to be made, from 75 to 100 parts of tannin are substituted for the acetate of alumina. When the mixture has been well kneaded together and made into a smooth paste, it is passed through rollers to form plates of the desired shape. These are dried and pressed into metallic molds previously heated, or they may be reduced to a very fine powder, which is introduced into heated molds and submitted to a strong pressure. The objects are afterward dipped into the following bath: Water, 100 parts; white glue, 6 parts; phosphoric acid, 10 parts. Finally they are dried, polished, and varnished with shellac.

EFFERVESCENT LEMONADE SUGAR.—The manufacture of effervescent lemonade sugar is said to be as follows: Five parts of powdered sugar are treated with an ethereal oil, and mixed with one part of bicarbonate of soda. This mixture is filled into candy molds, and pressed by means of a stamp. Within the mold a cavity is produced in the mass by the pressure, and into this there is poured one part of citric acid, which is pressed down, and then a fresh layer of aromatic sugar is added and pressed, after which the candy is finished.

LONG DISTANCE TELEPHONING.—If the Western Union Telegraph Co., as is stated, has purchased the right to use Baxter's long distance telephone, it will not be long before conversation can be carried on between San Francisco and New York with probably two breaks only.

SPIRIT OF TURPENTINE is now made, says a contemporary, from sawdust and refuse of the saw-mill. It is extracted by a sweating process, and yields fourteen gallons of spirits, three to four gallons of resin, and a quantity of tar per cord.

A VALUABLE building stone has recently been discovered near Albany, Oregon, upon which the action of neither heat, cold, nor moisture has any bad effect. It is one of the most important events that has ever occurred in the Territory. The stone is called granite sandstone, very rich in silica, of a close, fine grain, highly crystallized, unlaminate, and of a fine brown color. It has been used in this locality for many years, for fireplaces, door and window sills, and for monumental work. It has lately been put to some very severe tests, with a view to using it for the building of the great union depot at Portland. It was brought to a white heat, and suddenly plunged into cold water, and came out as solid and firm as before it went into the furnace.

BRICKS OF CORK. At the Nuremberg exhibition was shown a novel use of bricks of cork. These bricks have only been used for building purposes on account of their lightness and insulating properties, but they are also employed as a covering for boilers, and are said to excel even asbestos in preventing the radiation of heat. They are stated to be very cheap, being prepared of small corks, refuse and insulating cement. At Nuremberg, the application of cork bricks was largely shown. The usual size of cork bricks is 10x4x2½ inches.

A RAIL for common use has been introduced into France. It is imbedded in concrete, and is flush at the edges with the roadway. From the sides it slopes down to the center, so as to enable the wheels of vehicles to retain their place upon it. The estimated cost is about two dollars a yard. Other countries are also considering this.

IMPORTANT POSTOFFICE DECISION. A recent decision of the Postoffice Department is to the effect that a letter, after being sent, can be recalled by the sender upon his making application to the postmaster, who has authority to recall the same by telegraph.

GOOD HEALTH.

Pneumonia, Lung Fever and Kindred Diseases.

Dr. C. E. Page communicates to *Cotton, Wool and Iron*, a Boston publication, an excellent and suggestive article under the above head, which is of special interest in this latitude, because of the increasing number of deaths which are occurring among us from pneumonia. The extracts which we give from the Doctor's paper contain some pertinent points which are well worthy of careful consideration:

Pneumonia is, or should be, classed among the fifth diseases, with croup, diphtheria, scarlet fever, measles, etc. Whatever may be thought of these disorders, it is certain that pneumonia is not contagious. No person ever has it who habitually breathes pure air twenty-four hours in the day, and who lives on even approximately pure food (excess of even the purest food tends to impurity because of indigestion.) "Plain livers" seldom, abstemious vegetarians, those at least who know as much about air as they do about food, and whose practice corresponds to their knowledge, never have this disease. Physicians of all schools agree that sedentary persons, living in very warm rooms, should eat little or no meat, since this class of food requires active exercise in open air to "work it off." The condiments, spices, hot sauces, etc., associated with animal food, are a constant tax on the stomach and intestines, irritating them, besides directly contaminating the blood with unnatural elements.

Alcoholic drinks predispose to this disease and to all kindred disorders, preventing the normal waste of tissue; hence the plumpness of persons at certain stages of alcoholism.

Coffee and tea, as physicians well know, are in certain respects identical with alcoholic drinks in their physiological effects. They "lessen the waste," and the waste is what keeps the body clean.

Old age is regarded—rightly enough, too, in one sense—as a predisposing cause of pneumonia; but this arises mainly from the fact that old people are more likely to realize the waning powers of the voluntary muscular, than the digestive, system, and are more certain to curtail their fresh air, than food, rations.

Indigestion.

However caused, is, next to foul air, the cause of the generation within the system of impurities, which may, by their accumulation, produce finally one of the sicknesses I have named. A single excessive, or especially unbalancing meal may, where the predisposition exists, excite a fatal attack of pneumonia; and to skip a meal altogether, or to treat the system to a veritable fast day, would, by resting the alimentary apparatus and permitting the excretions to have "everything their own way" for an even twenty-four hours, be a most effectual preventive remedy for every one, who has any suspicion as to his or her physical condition.

Grief, anxiety, anger, etc., anything that tends finally to depress the physical state, is adverse to the digestion of food and the due nutrition of the body, and hence is promotive of disease. On the other hand, wholesome food, "the gospel of not too much," fresh air, exercise, constant ventilation of living and sleeping rooms, the cultivation of a fair and friendly spirit—all this tends to make a sound, clean body that cannot harbor disquieting emotions such as are named above.

The night air superstition continues to "side in" with the doctors, druggists and undertakers, and ought to have been buried in the same grave with its companion humbug, "no water in fever." We can only have night air at night, and it is purer on the outside than inside the dwelling, even with the best of ventilation, but when we shut up a roomful and breathe it over and over again, it is like washing in and drinking from the same pail. If the room breathes only through the crevices of the doors and windows, its occupant breathes in the same manner. Think of taking one's soup through the key-hole.

Everything that tends to depress the vital forces operates as a predisposing cause to pneumonia, or some other of nature's kill or cure remedies; for what we term diseases, generally, are attempts, and in ninety-five in the one hundred cases of sickness, successful attempts of nature to cure the disease from which the organism has been suffering for a longer or shorter time. Build up the system, then, by every available means. Ascertain, as best you may, what constitutes good living in a physical sense, and by use it will become the best living in every sense, insuring a greater degree of all the pleasures of life, and counteracting, so far as possible, all adverse hereditary influences.

The doctor quotes from another writer, who, in speaking of the effects of cold, or outdoor exposure, as an exciting cause for pneumonia, says: The victim may have exposed himself to weather too severe in itself, or comparatively too severe, because of the comparative resistive power of his system through debility. Consequently, it is, in a great many cases, a malady that the thoughtful man may escape. He may go out on a March night to come home and have pneumonia, or stay at home and be without it.

The reason of the above is that the cause of the disease exists in the system, which a slight exposure may bring out sooner than it would otherwise appear if special care was taken to prevent it. Moreover, the disease is quite as likely to be precipitated by the coming into a warm, unventilated room, as from the cold encountered during the walk. Impure food and unhealthy condition of the digestive organs is more likely to cause, and more often does cause, pneumonia than exposure to cold out-door air, whether in night or day time.

A CURE FOR SCIATICA.—A correspondent, writing to *London Family Fair*, says: "A cure for neuralgia and sciatica, and, as I am told, an unfailing one, is too valuable not to be recorded. An English officer, who served with distinction in the war with Napoleon, was once laid up in a small village in France with a severe attack of sciatica. It so happened that a timman was being employed in the house where he lodged, and that this timman, having been himself a soldier, took an interest in the officer's ease, and gave him the cure, which, in this instance, succeeded immediately and forever, and which I am about to set down. It is at any rate so simple as to be worth a trial. Take a moderate sized potato, rather large than small, and boil it in one quart of water. Foment the part affected with the water in which the potato has been boiled, as hot as it can be borne, at night before going to bed; then crush the potato and put it on the affected part as a poultice. Wear this all night, and in the morning heat the water, which should have been preserved over again, and foment the part with it as hot as can be borne. This treatment must be persevered with for several days. It occasionally requires to be continued for as much as two or three weeks, but in the shorter or longer time it has never yet failed to be successful.

EFFECTS OF ELECTRICITY UPON THE NERVES AND HEART.—Among the curious exhibits at Munich Electrical Exhibition were a series of photographs representing the various changes and contortions produced in the human face by subjecting the different facial nerves of a patient to the action of electricity. These were the experimental photographs made by Professor Von Ziemssen. The expressions of joy, pain, surprise, doubt, disgust, etc., were easily realized, according to the nerve that was touched by the electrode. Other observations and experiments by Professor Von Ziemssen promise to be of great importance. They institute a comparison between the continuous and the induced current in the stimulation of the important accelerator and depressor nerves which control the heart. He has found that an induced current, so far from stimulating the nerves of the heart, as heretofore believed, is perfectly inoperative, whereas a continuous current from an ordinary battery is of the very greatest activity.

SIT ERECT.—One of the worst habits young people form is that of leaning forward too much while at work or study. It is much less tiresome and more healthy to sit or stand erect. The round-shouldered, hollow-chested and almost deformed persons one meets every day could have avoided all the bad results from which they now suffer had they always kept the body erect, the chest full, and shoulders thrown back. A simple rule is, that if the head is not thrown forward, but is held erect, the shoulders will drop back to their natural position, giving the lungs full play. The injury done by carelessness in this respect is by compressing the lungs, preventing their full and natural action, resulting in lung disease, usually consumption. Sit erect, boys and girls, and look the world in the face.

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SAN FRANCISCO:

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TABLE OF CONTENTS.

EDITORIALS.—Copper Smelting Plant; Mines near
Johnson, 231. Passing Events; Arizona Copper Mines;
Silver Bell District, Arizona; Notes from Eureka, Nev.,
232. Silver Mining in Arizona, 233. A New Street
Railroad System, 233. Metallurgy in Arizona, 234.
Tombstone Notes; Copper, 237. Benson; Notices of
Recent Patents, 300ILLUSTRATIONS.—General Arrangement of Plant
for Copper Smelting, 231. Bird's-Eye View of San
Francisco, 233. Plan of Silver Mill; Details of Amal-
gamating Pan; Settler for Silver Mill, 233. R. F.
Bridewell's Cable Railroad System, 236MECHANICAL PROGRESS.—Curious Ideas
About Compression; Pile Driving by Dynamite; A Novel
Way of Breaking Metal; Tall Chimneys; Dangerous
Practices; The Giers' Soaking Pit, 233.SCIENTIFIC PROGRESS.—Science in Soap Bubbles;
Sun Exposures; Vibrations Produced by Railway
Trains; Thermal Belts of North Carolina; How Long it
Takes to Smelt; Sounds Produced by Flow of Liquids;
More Electrical Experiments on Vegetation; A New
Explosive; An Ancient Peruvian Bronze Chisel, 233.MINING STOCK MARKET.—Sales at the San
Francisco Stock Board, Notices of Meetings, Assess-
ments, Dividends and Bullion Shipments, 234.MINING SUMMARY.—From the various counties of
California, Nevada, Arizona, Colorado, Idaho, Mont-
ana, New Mexico, Utah, 234.USEFUL INFORMATION.—Cracked Glass; Best
Time to Cut Timber; Celluloid to be Superseded; Efferv-
escing Lemonade Sugar; Long Distance Telephoning;
Bricks of Cork; Important Post Office Decision, 237.GOOD HEALTH.—Pneumonia, Lung Fever and
Kindred Diseases; A Cure for Sciatica; Effects of Elec-
tricity upon the Nerves and Heart; Sit Erect, 237.NEWS IN BRIEF.—On page 300 and other pages.
MISCELLANEOUS.—Latest Instructions to Settlers
upon the Public Domain, 232. San Francisco; Ore
Veins and Reduction Works; Walnut Grove Mining
District, 236. Walker Mining District, Arizona, 237.
Arizona in General; Early History of Mohave County,
235. Superstitions About Gems; Indiana Capital in
Arizona Mines, 232.

BUSINESS ANNOUNCEMENTS.

Powder—Nitro Safety Powder Company, S. F.
Wagons—A. W. Sanborn & Co., San Francisco.
Engines and Machinery—Byron Jackson, S. F.
Mining Machinery—Globe Iron Works, S. F.
Abel Stearns Ranches—A. Robinson, S. F.
Belting and Lacing—Herman Royer, S. F.
Concentrating Machinery—M. B. Dodge, S. F.
Quartz Mills—F. J. Huntington, S. F.
Ore Pulverizer—W. L. Tustin, San Francisco.

Passing Events.

In reading over the various exchanges pub-
lished in the mining camps of this coast, we have
been struck with the wide range the mining in-
terests now cover. In some places they are hard
at work on their claims and in others the
weather is just beginning to let them go to
work. In certain localities, prospecting has
been going on for a month or more, while in
others, there is still snow to retard progress in
this direction. Several strikes are noted in the
various camps.General Crook has this week commenced
his campaign against the Indians in Arizona.
The expedition is fully equipped and supplied
for ninety days. It is supposed the fight will
be in Mexico, but at all events it is probable
that Crook will stop further raiding on the part
of the Indians.We publish this week a double edition de-
voted to the interests of Arizona, which how-
ever, contains also a great deal of value to the
general reader.MICA MINE.—Our regular correspondent in
Arizona, Mr. Crowell, writes us that recently
J. M. Bunkell, W. J. Perry and P. C. Healey,
brought into Tombstone some fine specimens of
mica from a new location in the Matucopa
mountains, Arizona. They brought in large,
thick blocks right from the surface, with the
surface moss clinging to them. One sample
was 11x12 inches and of fine cleavage and tough,
only slightly smoked. Some specimens were
very clear and white. The location is only ten
miles from the railroad. Two of them took out
500 or 600 pounds in about two hours.

Arizona Copper Mines.

Nowhere throughout the Pacific coast region
are the cupriferous deposits more widely dis-
seminated or of better quality than in this Ter-
ritory. Remarking on this subject in a general
way, Hinton, in his "Handbook to Arizona,"
observes that the copper districts are scattered
over nearly the entire country, the principal
sites of active production, so far as this indus-
try has been prosecuted, being at Clifton, in
Apache county; at the Planet mine, Mojave
county; at the Copper Queen mine, Pima
county, and at the Old Dominion mine in Globe
district, Pinal county. Some five or six smelt-
ers have within the past year or two been
erected and gone into operation in various other
parts of the Territory, the above-named con-
sisting of works that have been running for
several years and already made a considerable
production. Copper ores were raised and
smelted in a rude way at the old Ajo mine and
at some other places in Yuma county by the
Mexicans many years ago. The first cupriferous
deposits worked in Arizona since the Ameri-
can occupation of the country are situated in
Mojave county, at a point about three fourths
of a mile south of Bill Williams' Fork and
twelve miles east of the town of Aubrey, on
the Colorado river; these deposits constituting
what is now known as
The Planet Mine.Copper ores of high grade were discovered
here as early as 1863. In 1864 a company hav-
ing been formed in San Francisco for working
these mines, operations were commenced the
following year, and have, with considerable in-
termissions, been prosecuted ever since. The
quantity of copper produced here amounts to be-
tween eight and ten thousand tons, made from
ore that has averaged perhaps thirty-five per
cent metal. The scarcity of wood and water
in the vicinity has proved a great detriment to
mining. Transportation of supplies for the
mines and of bullion to market has also been
costly, uncertain and inadequate. Of late but
little has been done at the Planet mine, but as
the line of the Atlantic and Pacific railroad
passes near it, work will probably be resumed
here at no distant day. Some developments
have also been made on the Apache Chief, a
promising copper vein in the same neighbor-
hood.The next of those modern exploitations for
copper in Arizona was undertaken on the series
of lodes owned by the Longfellow company,
better known as

The Clifton Mines,

Situated in the extreme southeastern part of
Pima county, near the New Mexican line. Al-
though laboring under immense disadvantages
until lately, since the railroad approached it,
this mine has made a very considerable and
highly profitable production during the past six
or eight years. The ore here, chiefly the red ox-
ide variety, occurs as in most other places in
Arizona, in strong veins lodged between
quartzite and limestone, or wholly in limestone,
and has averaged as it came from the mines,
twenty-five per cent metal. The ore bodies of
this grade are from ten to fifteen feet thick. The
cupriferous zone at this point can be traced for
several miles, though the richest section of it ap-
pears to be in the vicinity of Clifton. Although
some of the veins have been opened to a depth
of 500 or 600 feet, no deteriorations of the ores
have occurred here. Some copper glance, with
occasional bunches of pyrites have come in, but
not enough to effect the general character of the
ore. For some time, at first, only the rudest
kind of smelters were in use here. Latterly, how-
ever, more complete works have been con-
structed. The practice at these mines has been
to reduce the ore to black copper containing
ninety per cent metal by smelting with pinyon
charcoal, of which about 500 pounds are required
for each ton of ore.This charcoal is burnt at a distance of ninety
miles from the mine, and costs, delivered at the
furnaces, \$30 per ton. Until recently the prod-
uct of these mines was hauled with ox teams
to El Moro, in Colorado, 750 miles, at a cost of
\$80 per ton of 2,000 pounds. At El Moro it
was shipped by rail to Baltimore, a distance of
2,500 miles, at a further cost of \$20 per ton.
The cost of mining and reducing on the ground
to black metal has, until lately, averaged \$160
per ton, refining at Baltimore having involved
a further expense of \$40 per ton, bringing the
cost of one ton of pure metal up to \$300, which,with the price of copper as low as it is at present,
would have left but little margin for profit.
Besides a saving of about \$70 per ton in freight-
ing to the seaboard, other economies have recently
been effected in the business of copper produc-
tion at these mines.While the Planet first, and the Clifton mines
at a later day, were the most productive in
Arizona,

The Copper Queen

Stands now the big mine of the Territory, its
net annual product rivaling that of the great
silver mines in the Tombstone and the Pioneer
districts. This mine is situated in what are
known as the Mule mountains, being about
thirty miles from Fairbanks, on the Atchison,
Topeka & Santa Fe railroad, and about eight
miles from the line of New Mexico.The last annual report of the Copper Queen
Company issued one year since shows the fol-
lowing facts: At the time the company came
in possession of this property, not quite three
years ago, although but little work had been
done upon it, there were estimated to be in
sight over 34,000 tons of ore above the first level,
which had been prospected by a drift not over
ninety feet long, no crosscutting having as yet
been done. The work of further exploration
was at once begun and prosecuted with such
vigor and success that the ore reserves by April
1, 1881, held not less than 83,000 tons of ore,
18,108 tons having meantime been extracted
and smelted. The value of the copper turned
out during the year ending April, 1882,
amounted to \$1,020,859; operating expenses,
including freight, refining, etc., amounted to
\$532,733, leaving as net earnings for the year,
\$488,126, out of which \$300,000 were disbursed
to the shareholders in dividends—surplus profits,
\$188,126. During the past year the net
earnings of the company have amounted to
\$600,000—\$500,000 of which has been paid out
to the shareholders in quarterly dividends of
\$250,000 each. The company calculated that
they have ore enough in their reserves to
keep up the present rate of production for
years to come. The reduction works here
consist of two water-jacket furnaces, having
capacity to smelt about eighty-five tons of ore
per day, producing about 22,000 to 25,000
pounds of black copper. With their present
stock of ore the company might well largely in-
crease the reduction capacity, though it does
not appear that they intend to do so, being
satisfied with the present earnings of the mine.
The amount for 1882 was 4,033 tons, 956 pounds
of black copper, averaging ninety-six and one
half per cent.

The Old Dominion Company.

The old Dominion Copper Company owns mines
at Globe (the Globe and Globe ledge) the Key-
stone and Old Dominion mines, two and a half
miles from Globe, the Black Copper group six
miles from Globe, in Mineral Creek district.
The furnaces are at Globe and the ores of
the Old Dominion and Black Copper group
not being worked at present. The No. 1
furnace began work June 13th, 1882,
but has not been run steadily owing to
lack of fuel at times. Up to April 18th the
company has produced 2,824,200 pounds of cop-
per or 226 running days of one furnace, or an
average of 72,000 pounds per day. They are
running now two furnaces producing from ten
to twenty tons per day. The full capacity is 150
tons of ore per day, and from twenty-five to
thirty tons of copper.Among other copper mines in Arizona that
have already made a considerable production or
will soon be in a condition to do so, are the
United Verde, the Chase Creek, the Coronado
group, Castle Creek, the Copper King, Copper
Mountain, and several properties in Dos Ca-
bezos district; the prospect being that the out-
put of copper in the Territory will be greatly
increased for several years to come.

Silver Bell District, Arizona.

From Our Traveling Correspondent, B. W. C.

The Young America group consists of five
full and two fractional claims in Silver Bell
mining district, which is forty miles west of
Tucson. At present they have leased the Pima
Copper Co.'s smelter at Felton, four miles away
and will start up smelting on high grade copper
ores. They expect the whole fluxes and all, to
average fifteen per cent. Iron hematite ore with
five per cent copper, and ninety per cent iron.
There is lime rock on the claims. They are now
waiting for teams, to haul ore from the mines to
the smelters, and coke from the railroad to the
smelters. The depot of Kilitito, is seventeen
miles west of Tucson, the railroad point of sup-
plies. They expect to reduce daily thirty tons.The water jacket furnace is in charge of Mr.
Horbury, or "Uncle Jesse," a very successful
metallurgist. Dr. C. H. Lord is superinten-
dent and F. H. Lord, assistant superintendent.The Young America has a shaft down sixty
feet perpendicularly and crosscut to ledge.
They are now drifting on the vein with the face
of drift in ore of high grade, of red oxide. In
the same claim a tunnel 160 feet long crosscuts
the ledge and drifts each way have been run on
ledge. The ore is green carbonate, and black
sulphur, assays of which have run as high as
\$627. On the same claim are four other
shafts for the various conveniences of air and
development.They are working now about sixty-five men
of whom twenty-five are Mexicans. Most of
the work is done by contract at eight dollars per
foot, for a depth of fifty feet from the surface.
This property, a new starting up, promises a
good report to all concerned, and especially to
the stockholders. Several very fine photo-
graphs of the mine and the region around it
have been made.

Notes from Eureka, Nevada.

[From Our Regular Correspondent.]

EDITORS PRESS:—I do not remember when
Enreka (in town) has looked as dull as it does
at present. It seems as if a thunder cloud had
burst upon it. The mines that we have been
looking to for support for the past ten years
are no longer sending out the streams of bullion
that formerly made them two of the best mines
in America. The men are not employed upon
Ruby hill in as large numbers as they were in
the more prosperous days.

Four Dollars per Day

For a miner is, unhappily, not always to be had
for the asking. Miners, in fact, are now often
willing to take even chances with the mine
owners underground, and are less apt to lose
their hard-earned money by stock gambling.
These are facts worthy of consideration. Cap-
italists who are afraid to pay miners at the rate
of \$4 per day can find men willing to take a
share in the risks for a share in the profits.
Men who have been spending their earnings in
paying miners \$4 per day and quit broke, have
discovered that it does not require extraordinary
sums of money to develop their mines. Many
properties in this district that were formerly
considered only good for rich men to own, it is
now found can be operated with profit by poor
men. And this is being done, through a change
worked by the failure of the Albion.

The Frankie Scott Consolidation

Of mines on Prospect Mountain, were lately
leased to a party of miners who agreed to work
the ground on shares. So long had the mine
been lying idle, the bottom of the main incline
was filled almost chin deep with rats' nests, but
a small vein of ore had been followed from the
surface several years ago, which was then
thought barely sufficient to pay for sinking on
any deeper, but now appeared good enough to
take chances on. The lessees had not worked
in the ground longer than a week when the
vein opened out to a foot thick. The ore found
is very rich, some of it being full of horn sil-
ver. It will average from \$200 to \$300 per ton.
It is quite lately that a rich strike was made in
the Antelope mine adjoining the Frankie Scott.
These mines lie to the south of, and only a
short distance from the Enreka tunnel, and the
Alexander company's ground. The Enreka
tunnel is looking well as usual. The new
hoist is in place and ready to run. The Addi-
son chamber which is about sixty feet easterly
from the new engine shaft is looking better than
ever, showing signs of growing stronger with
depth. The same may be said of the carbon-
ate vein, which appears to be making into a
regular fissure.

The Albion Mine,

On Ruby Hill, is very quiet looking at present.
I was down in it yesterday, the first time
for nearly four months. Then it looked well,
and there was considerable ore in sight, but
it appears now that there was not sufficient at-
tention paid to prospecting the mine while the
ore was being extracted. As a son of Erin re-
marked, "The devil's the mather wid the mome,
but it's top-heavy." The money that should
have been expended for development under-
ground was spent in making unnecessary im-
provements upon the surface.Matters are being remedied as best they can
be. The miners' liens have all been paid up.
The bullion that was on hand at the time the
works were closed down has been marketed.
The ore from the bins is being shipped to the
Enreka Con. furnaces. There are miners un-
derground at work only where needed. There
are four miners taking out ore on tribute in the
Mammoth cave.I noticed particularly that there is ore mak-
ing downwards underneath the big chute, and
this is well worthy of note, when taken into
consideration the fact that in the Uncle Sam
crosscut, on the 335 level, is a vein of iron ore
which there are miners now employed in ex-
ploring. At the top of the raise the appearance
is encouraging, for the iron is the next thing to
ore, and it presents the same appearance as the
iron in the chambers that have been worked
out. Between the two points there is room for
a fair sized body of ore to make, probably about
225 feet on the dip, and 120 feet in vertical
depth. In the east upraise and October cave
are six men taking out ore on day's pay. In one
place there is very good looking ore, about five
or six feet in thickness, and there is a chance
for this to improve. There are two men taking
out ore on tribute from the top of the June

(CONTINUED ON PAGE 297.)

Silver Milling in Arizona.

While California has the credit of being the leader in the matter of gold mining appliances, Nevada bears a similar reputation with regard to silver. Experiments in every possible direction were made on the Comstock, where there was plenty of money to spend for them and plenty of enterprising men to carry them out. The experience of these many years is now being taken advantage of in newer regions, and fewer failures are chronicled than formerly.

Of course, in all new camps there have to be greater or less changes, made according to the nature of the ores and the character of the appliances at hand. The processes of working silver ores, in particular, have been carefully studied, and every possible economy has been practiced to make the mines more profitable.

In Arizona and New Mexico, where many new mills have been put up within the past few years on newly-opened mines, the companies have been able to obtain the very last appliances of all kinds, and their mills, therefore, embody all the latest improvements. They can

attained. The mineralogical and chemical constituents of the ore, and its physical properties, throw a flood of light upon the success or failure of a process. Figures representing totals I have subdivided as much as possible, so that the cost per ton for labor, castings, chemicals, etc., are apparent. Unless all these factors are known, no accurate comparison can be drawn, since in this branch of metallurgy, more perhaps than in others, the weakness of any one link in the chain of operations demoralizes the remainder. That it costs \$10 to mill in one locality, and \$5 in another, is, in itself, no criterion of the quality of work done. But when these costs are referred to a standard, or when several mills are working on the same character of ore in the same district, and the conditions are known, losses, errors, etc., may be easily detected and remedied. As a standard, the condition existing in any district can be taken. The cheapness with which the ores of the precious metals have been treated of late years in remote portions of our western Territories is remarkable. The handling of very low grade ores has been made possible, and the cost of beneficiating the same has been reduced to figures that will permit of working ore bodies which, only a few years ago, were excluded from the category of paying investments.

The Harshaw Mill.

The mill of the Harshaw mining company,

are composed of round bars of iron, one and a half inches in diameter, fourteen feet long, spaced two inches apart, and inclined at an angle of 32°. Rectangular bars set on edge are preferable to round bars, not being so liable to clog. Such screens are a material item of economy where large amounts of ore are handled, for, when placed so that the wagons can be unloaded over them, the finer material is separated from that which requires crushing, and the larger pieces alone require further handling, since what passes through the bars falls through chutes directly into the ore bins. It seems superfluous to add that wherever the expensive labor of the west can be advantageously replaced by automatic contrivances, it should be done, especially in the reduction of low grade ores; yet how often is this simple axiom ignored!

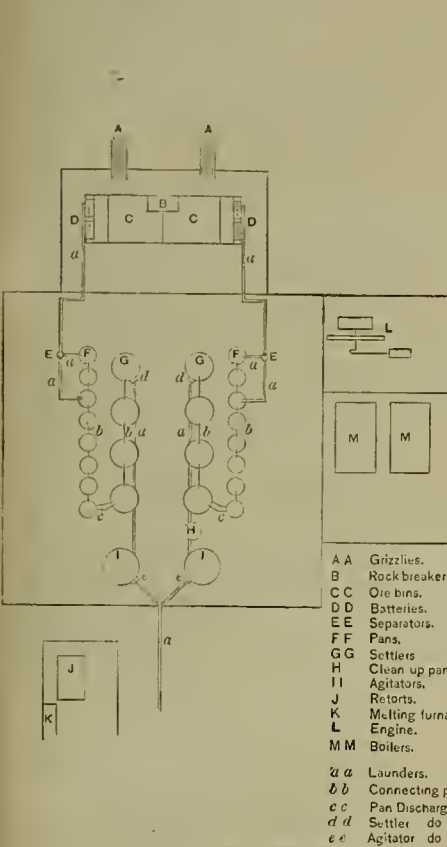
On the crusher floor, the lump ore, rolling down over the screens, is fed into a rock breaker of the "Eclipse" pattern, and reduced to pieces about the size of a hen's egg. This breaker is in operation ten hours a day, crushing in that time sufficient material, inclusive of that passing through the screens, to supply the stamps for twenty-four hours.

On the dump and around the crusher, four or five Mexicans are employed, whose wages are from \$1.50 to \$2 per day.

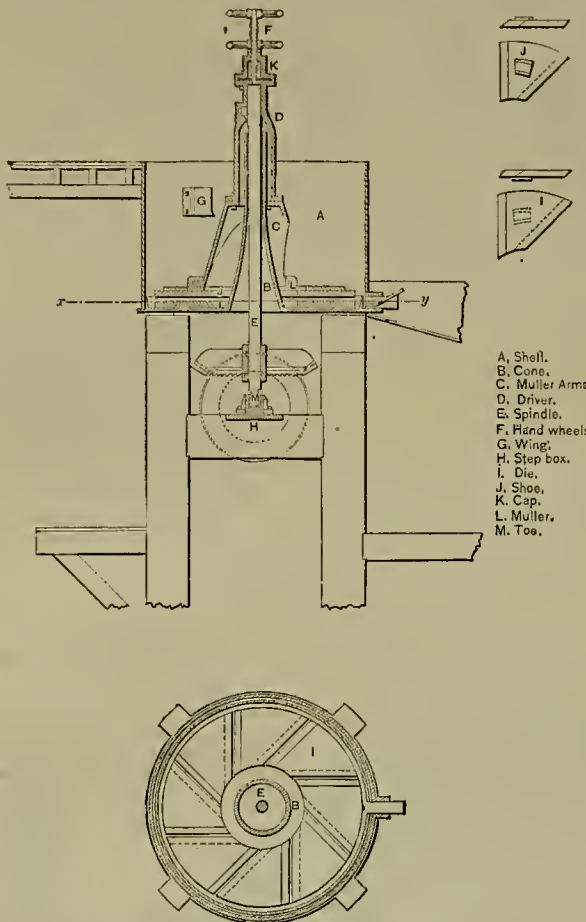
The ore bins, placed immediately below the

Stem.....	465 pounds.
Shoe.....	122 pounds.
Head.....	20 pounds.
Tappet.....	110 pounds.
Total.....	837 pounds.

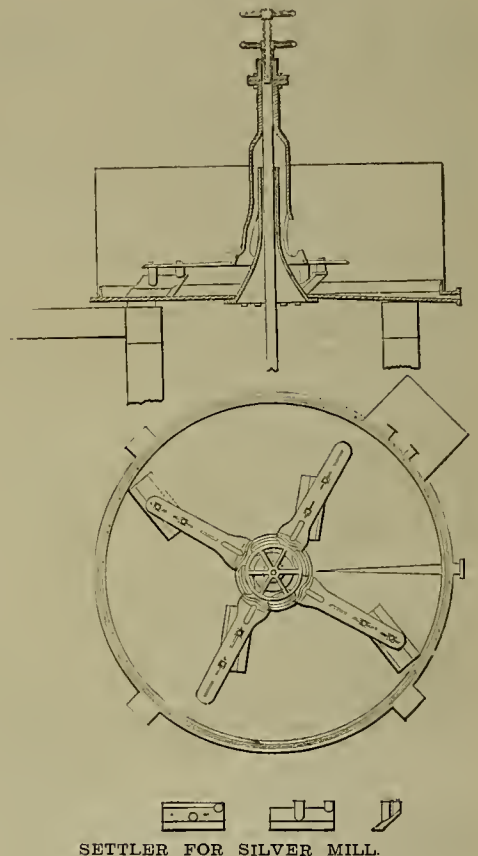
They are run at ninety drops per minute, and fall six inches. A greater drop was experimented with, but it was found that the heavy stamps crushed through the light material and expended the additional force acquired to the detriment of the wearing parts and mortar. The stems are fourteen feet long, and three and one fourth inches in diameter, with nine and one half inches between centers. The shoes are of white iron, and last on an average eighty days. The dies which are of the same material, weigh 107 pounds. Ten double-armed cams, with a sweep of thirty-five inches, are keyed on to a cam shaft fifteen feet long and six inches in diameter, which has three bearings, each of thirteen and one half inches. The stamp-heads are of tough cast iron, with wrought iron bands, shrunk on at bottom and top, but in this case the bands used are too heavy, leaving only a small ring of cast iron intervening between the shank of the shoe and the band, which has a contrary effect to that desired, and weakens rather than strengthens the head. The discharge from the mortars is single, eleven inches high, through a number three vertically slotted screen of sheet iron.



PLAN OF SILVER MILL.



SECTION THROUGH 2 ft.
DETAILS OF AMALGAMATING PAN.



SETTLER FOR SILVER MILL.

accordingly do very good work indeed. All mining men are interested in the facts, resulting from the experience of every day work, and are glad to see metallurgists give others the benefit of their experience. We are pleased, therefore, to be able to present to our readers a paper on the subject of "Silver Milling in Arizona," by W. Lawrence Austin, Ph. D., Charleston, Arizona, which was read at a recent meeting of the American Institute of Mining Engineers:

It has been suggested to me that some data, bearing on the treatment of silver ores in south Arizona, would be in accord with the objects of the present meeting. I have, therefore, made a few notes, gathered from practical experience at some of the best known works of that district. Presuming the general arrangement of a silver mill to be familiar to members, the subject having been repeatedly brought to the notice of the Institute, it is my aim in the following description of the modus operandi at the different mills to which I would invite your attention, to give simply such salient points of the apparatus as have a direct bearing upon results, together with the cost of materials, labor, etc. I have gone somewhat deeply into detail in my descriptions of machinery, thinking that possibly some of our members engaged in this branch of the profession might find something of interest among them. In an industry such as silver milling, where the various works are scattered over a vast extent of territory, and the conditions under which results are obtained are subject to the greatest variations, it is essential to go into rather minute details in describing plants, processes, etc., in order to afford a clear idea of the operations. Not only should results be given, but also the means by which such are

situated in the pleasant little mining town of the same name, in the midst of the Patagonia mountains, southern Arizona, recently completed its first working year, after a twelvemonth of uninterrupted operation. The results attained reflect credit on the management, when the high price which labor commands in that remote quarter, and the distance from sources of supplies are considered. At that time the nearest railroad station was Pantano, on the Southern Pacific, so that all material for the mines and mills had to be hauled by wagons more than sixty miles, over a road that, in the rainy season, was almost impassable for heavy freight. The surrounding country is well wooded, mesquite, scrub oak and juniper all being found within easy access of the mill. The supply of water, however, is limited. I am indebted to Mr. Covington Johnson, the late superintendent, for the opportunity of examining in detail the workings of the system in use at Harshaw. The ore of the Hermosa mine, which alone is treated in the mill, is typically "free milling." Horn silver, green when first taken out, but darkening in color when exposed for any length of time, is scattered through a gangue consisting of decomposed fragments, apparently broken from the enclosing porphyritic wall rock, in which quartz, clay, hydrated oxide of iron, and black oxide of manganese are prominent features. It is readily friable, the stamps crushing an average of five tons per head in twenty-four hours, and occasionally as high as six tons have been run through.

The ore is hauled from the mine to the mill down a heavy grade of something under a mile by contractors, at a cost of fifty cents per ton. It is weighed at the mill—the weigher's wages are \$4 per day—and dumped over coarse screens. These screens, commonly known as "grizzlies,"

crusher, have a capacity of 200 tons. In designing a mill, it is always well to give such bins the greatest dimensions practicable, as they are often called upon to act as reservoirs in case of repairs being made on the rock breaker, or of accidents at the mine or on the road. When possible, they should be made to hold two or three days' supply of ore for the mill. From the bins the ore passes through chutes into automatic feeders which serve the stamps. Such chutes are quite short, and provided with a gate to regulate the supply issuing from the bins.

The self-feeders are of the "Hendy-Challenge" pattern, and give perfect satisfaction. This mill was originally fitted out with the "Eclipse" feeders, but after a trial they were replaced by the present "Hendy."

The Batteries

Are arranged back to back, as shown in the accompanying plan. Ten stamps are placed on either side, with the ore bins between them, the latter being built on to the battery frames, and the whole structure is thoroughly braced and bolted together.

Such an arrangement affords additional stability, and reduces, in a measure, that vibration which is so trying to the machinery, as well as to the man whose duty it is to attend to this department; on the other hand, its main drawback is that the "battery feeder" is obliged to exert himself more than is otherwise the case in order to watch over both sides. The batteries are four in number, each of five stamps, crush wet, and have an average capacity of five tons to the head. They are served by two men—wages \$4.50 per day—each of whom stands a twelve-hour shift. The stamps weigh over 800 pounds, the weight being divided as follows:

The actual discharging surface, deducting that covered by the wooden framing, is 479 square inches. The slots are one half inch long and one thirty-second of an inch wide. There are 9.6 of these slots to the square inch of screen surface. The top of the screen is inclined outward ten degrees from the perpendicular. The mortars are fifty inches long, inside measurement, and are provided with a double discharge, but it was found advisable to stop up the rear opening, partly owing to lack of water, partly because when a single discharge is used the screens are less liable to become stopped up. This was accomplished by blocking up with woodwork quite close to the stamp-heads, facing the whole with one half inch iron to prevent rapid wearing away. The closer the iron plate is brought to the stamps, the better are the results obtained. By this means, the splash caused by the falling stamps is thrown forcibly forward, the screens are kept clear, and the discharges are increased. While both discharges were open, the rear one passed more material than the other.

From the Batteries, the Pulp

Runs through laundries to a separating hopper, in which the coarse sand is separated from that already sufficiently fine for amalgamation. This apparatus is a simple funnel, with a partition at the side, so arranged as to direct the stream of pulp downward, and allow the sand to settle and discharge from the bottom, while the finer material rising on the other side of the partition passes through an overflow and laundries into the pans. The sand is run into separating pans. Each line of pans is connected throughout by piping, placed seven inches below their tops, which allows the pulp to flow on uninterruptedly, every pan in turn being filled, discharging into the next. The sand which is carried from

the bottom of the separator into the first pan of the series is ground in that and in the next following, and joins the lighter material coming from the overflow of the separator in pan number three. By this means all tank shoveling is obviated, the pulp being brought into the amalgamating pans in fit condition for treatment with quicksilver. It has not yet been satisfactorily proven that all milling ores will equally well admit of this easy solution of the tank difficulty, but, where it can be used, the large labor saving in time and money to be gained by this simple expedient is apparent. In the case under consideration, the ore being entirely free from "base," and the gangue having a light specific weight, the conditions are very favorable for this mode of treatment.

The Amalgamation

Is attended by two amalgamators—wages \$5 per day—and by two helpers—wages \$4 per day—working twelve hour shifts. The pans are of the ordinary flat bottomed "combination" type, as shown in the accompanying sketch. They are five feet in diameter, three feet four inches high, have cast-iron sides, and taper up from the bottom. The millers make sixty-eight revolutions per minute, and are lowered in the first five pans of the series. As the pulp proceeds down the line, and is subjected to the grinding action, the wear of the shoes and dies is lessened in each succeeding pan. There are eight shoes and eight dies to a set, weighing 1504 pounds. In the first two pans, where most of the grinding is done, the life of a set varies from thirteen to eighteen days, whereas in No. 5 pan they last several months. In the last three pans the millers are raised and only serve as stirrers. The pulp is heated to a scalding temperature by live steam introduced directly from the boilers. It requires about four hours for the pulp to pass through the eight pans, and 200 pounds of fresh quicksilver are charged into each of the last six pans every hour, the old charge being previously drawn off into settlers through inverted siphons, which are closed before the introduction of the new. The greater part of the amalgam accumulates in No. 3 pan, which is cleaned out every morning. Some amalgam always manages to work back into the first two pans, and is found there in the monthly clean up, although no quicksilver whatever is introduced into them. Some experiments were made to determine whether or not the amalgamation could be conducted cold, and it was found that the amalgam, instead of accumulating in any one pan as before, was pretty evenly distributed throughout them all. This illustrates the part which heat plays in amalgamation, for, although the percentage worked to was in both cases about the same, still the time which it was necessary to keep the pulp in contact with quicksilver is greatly increased when steam is not used.

The Settlers

Are placed in the usual manner below the pans, one to every pair of the latter. Like the pans they are constructed entirely of iron, eight feet in diameter, three feet deep, and make thirteen revolutions per minute. The shoes, as shown in the accompanying sketch, are placed so as to throw the pulp downward, and at the same time toward the center. They are four in number, one on each arm, and are raised one fourth of an inch from the bottom. As the pulp is already quite thin, very little clear water is used to dilute it further, but the temperature is considerably lowered by passing cold water through a spiral pipe attached to the sides of the first settler. The settlers are connected in a similar manner to the pans, but in their case the piping is given a down grade, so that the end settler is never more than half full.

The tailings after leaving the settlers fall into wooden agitators, which make twenty revolutions per minute, and are shovelled out once a month. From then the tailings run to waste, carrying an average value of four dollars per ton. Only

Small Quantities of Chemicals

Are used in the pans—a little cyanide of potassium, with a view of cleansing the quicksilver, and some caustic lime to collect any that may become floured. These are fed into the pans automatically, the cyanide of potassium into No. 3, and the lime into No. 7. Altogether only fourteen pounds of the cyanide and 120 pounds of lime are used to 100 tons of ore. In order to determine how much lime is to be added, a dipper full of pulp is taken from No. 8 pan and washed with a gentle stream of clear water, until only the quicksilver remains. This is usually in the form of small globules. If, on gently shaking, these readily unite, all is well, but should they refuse to do so, it shows that not enough lime has been used. Owing to the entire freedom of the ore from "bases" of any nature, the amalgam produced is remarkably clean; still a portion of the iron from the wear of shoes and dies finds its way into the amalgam, but is easily gotten rid of in the clean-up pan. It usually requires four hours to clean up a charge of amalgam. About 1000 pounds is put into the pan and thinned with fresh quicksilver, then heated by live steam and stirred for a couple of hours. The impurities rising to the surface are wiped off with a sponge, and about equal quantities of salt and sulphuric acid are thrown in, and the whole is stirred for an hour. No difference in the appearance of the amalgam is effected by these chemicals, but on the addition of caustic lime a black scum immediately makes its appearance. This is washed off by allowing a

current of clear water to flow through the pan. The amalgam is then taken out and piled on straining sacks.

The Retorting and Melting

Is carried on in a separate building. One man attends to both—wages five dollars per day. The retorts are five feet three inches long over all, one foot inside diameter, and weigh 1,170 pounds. They have a central discharge, and hold when full 800 pounds of amalgam. A cord of scrub oak suffices for retorting seven or eight charges. The firing lasts about five hours, the amalgam retorting to one sixth.

The furnaces for melting the retorted bullion are 15'x16', and 21' deep, inside measurement. Eight bushels of a very inferior charcoal are used for melting a bar of 2,000 ounces. A No. 70 graphite crucible is used in this melting. The bullion averages .995 fine, or more. All quicksilver used in the mill is pumped up to the pans by the hydraulic pressure system, a pipe connecting the quicksilver reservoirs with the mud-drums of the boilers.

The motive power of the mill is furnished by a 200 horse-power engine—cylinders 42"x20"—run at sixty revolutions per minute. Two engineers are employed—wages \$5 and \$6 per day, respectively.

Four tubular boilers—15' 6"x54"—carrying eighty-five pounds pressure supply the steam, and require sixteen cords of the assorted wood of the country per day. Three firemen—wages \$3.50 per day—and two wood-passers—wages \$2 per day—attend the boilers.

All the water used is pumped from the gulch below by two Cameron steam pumps (No. 6) through a 2" pipe. The boiler which supplies these pumps requires eight cords of wood per week; two engineers—wages \$4 per day—look after the pumps.

The cost of reducing a ton of ore at these works, estimated from a run of 2,643 tons, was \$3.12, but this does not include the hauling, stated above to cost fifty cents per ton, or the general office expenses. This amount is subdivided as follows:

Cost Per Ton of Ore.

Labor.....	\$1.23
Supplies.....	1.82
Assaying.....	0.07
Total cost per ton.....	\$3.12

The cost of labor, per ton of ore, in the various departments, is as follows:

Crushing.....	\$0.26
Amalgamation.....	0.20
Power, pumps, and repairs.....	0.40
Foreman, melter, etc.....	0.37
Total.....	\$1.23

Cost of Materials Per Ton of Ore

Quicksilver.....	\$0.42
Chemicals.....	0.07
Castings.....	0.29
Illumination and lubrication.....	0.07
Fuel.....	0.78
Supplies.....	0.19
Total.....	\$1.82

The consumption of wood, per ton of ore, was 0.15 cord, and of quicksilver 0.96 pound.

The Mills at Charleston.

Most of the mills working the ores of the Tombstone district are distributed along the line of the San Pedro River, at an average distance of ten miles from the mines at Tombstone.

The works at Charleston, of which I am manager, are the property of the Tombstone Mill and Mining Company, and are under the general supervision of Professor John A. Church.

These mills were originally intended for dry crushing, and were provided with rotary dryers, automatic roasters, and all the necessary paraphernalia for a chloridizing roasting, as it was expected that the ore would become base as depth was obtained in the mines. But, contrary to expectation, the deposits retained their free milling qualities as they went down, and the furnaces were never brought into requisition. Upon ascertaining the true character of the ore under treatment it was decided to change the batteries to "wet crushers," in order to increase their capacity, which alterations injured the symmetry of the plant, and left it working at some disadvantage over what might have been had such a change been foreseen in the original designs.

The smaller of these mills (the Pioneer mill of the district), was originally built by the company as an experiment, and constructed with an eye to economy; a wise precaution, as many have learned to their cost who have anticipated developments in their mines by the construction of expensive reduction works. This mill was originally fitted with ten stamps, four pans, and two settlers, and run by a Lefel turbine, water being brought in a ditch from a dam about one mile up the river. Later, in order to increase the capacity, five stamps, two pans, and a settler were added. To run this additional plant up to the necessary speed required more power than the turbine could furnish, so an engine was purchased as an auxiliary. The second and larger mill was subsequently acquired by the company. As both mills run on ore from the same mines and the processes are identical, a sketch of one mill will suffice for both.

It is to be regretted that owing to the separation of the mills, consequent doubling of the payroll, and increased expenses from every source, the cost of milling given below will be scarcely a guide to what could be done with a properly arranged plant. I do not hesitate to say that with altered conditions a reduction of 20 per cent. per ton in the cost of ore milled could be effected, the quality of the work remaining the same.

In the following hasty sketch, reference is had to the larger mill alone.

The Power is Furnished.

By a horizontal engine with Corliss bed and Meyers patent cut-off, making 70 strokes per minute. The cylinder is 16" x 36". This engine runs with remarkable smoothness, and is not shut down more than once in sixty days, and then only to afford an opportunity for cleaning out the boilers, in which, owing to the water used, a scale rapidly collects. These latter are tubular, 54" x 16", and carry steam from 90 to 100 pounds pressure. Farciot's patent pump and heater feeds them, pumping the water in at boiling-point. They consume on an average seven cords of mixed wood per day, costing \$9 per cord; black oak, white oak, willow, and pine being used indiscriminately. All the water for the mill is pumped a vertical height of 100 feet by a No. 5 Knowles steam pump, placed 200 yards from the mill, which readily supplies more than is consumed. Steam is carried to this pump from the mill boilers. The ore is brought down from the mines, a distance of ten miles, in wagons. These wagons are connected in pairs, weighing about 5 tons; they carry 14 tons of ore between them, and are drawn by sixteen mules. This hauling is done by contractors at \$3 per ton. The bottoms of these wagons consist of a series of pieces of plank, 6" x 2", laid crosswise, their ends resting on the framework of the wagon bed, so that, when removed one at a time, they allow the ore to drop out, and permit a rapid and easy unloading. It requires on an average twenty minutes to unload a pair of wagons constructed on this plan, and, as they are filled at the mines from self-discharging chutes, the driver has little labor in loading and unloading.

The ore is wheeled in barrows

From the Dump to the Crusher

Through which it all, coarse and fine, passes, no screens being provided. One of Hendy's breakers is used. The bottoms of the chutes leading from the breaker to the bins are, for a distance of 5 feet, made of 4" steel bars set 3" apart, allowing all the finer materials to fall through on to a shaking screen hung below. This shaker is provided with the same screens that are used in the batteries, and separates that portion of the ore already sufficiently fine not to need crushing, which is sent direct to the pans. This relieves the batteries materially, and decreases the amount of "slimes." By this simple contrivance the capacity of the mill was increased 5 per cent., or more, the amount depending on the fineness of the ore, and also on its per cent of moisture.

The batteries are fed from the bins by the "Hendy-Challenge" self-feeders, which here, as elsewhere in my experience, give entire satisfaction. The stamps are 20 in number, drop 100 times a minute, fall 61", and when freshly shod, weigh about 750 pounds, the weight being divided as follows:

Stem.....	340 pounds.
Head.....	200 pounds.
Tappet.....	90 pounds.
Shoe.....	120 pounds.

The die weighs about 85 pounds. Some of the stamps carry extra tappets, bringing their weight up to 800 pounds and over. The shoes have an average life of one month, and when worn out weigh about thirty-five pounds.

A Novel Feature of these Batteries

Is the arrangement of the guides; instead of being grooved to receive the stem, square recesses are cut, into which wooden keys are fitted, so that the grain of the wood is parallel to the motion of the stem, instead of across it, as is usually the case. With such an arrangement, the guide boards themselves are subject to no wear, the keys being easily taken out and replaced. This plan might be advantageously adopted where light stems are in use which are liable to spring, and in such a condition saw out guide boards very rapidly. But when stems of 3 1/2"-3 3/4" are used, they present no advantages over the old plan. The mortars have double discharge, but the rear discharge has been blocked up with wood faced with iron plates, as close to the stamps as practicable. The average product of these batteries during the first six months of the year, including stoppages, has been two and nine-tenths tons of medium hard rock to the head of stamps, per day of twenty-four hours, crushed through a 30-mesh screen. Various screens have been tried, but the best results have been obtained from Russian iron screens, vertical slotters with a "burr" on the inside.

From the batteries the pulp goes into settling tanks.

The Pans,

Eight in number, are flat-bottomed, five feet in diameter, three feet high, and have wooden sides of Oregon pine curls, two and one half inches thick. The die is a solid cast-iron ring one and one half inches thick, weighing 750 pounds, and occupying most of the space between the cone and sides. It is fastened in with Portland cement. The muller, weighing 570 pounds, carries eight shoes weighing collectively, 816 pounds. Each pan is provided with three wings shaped like a reversed plowshare. The settlers are nine feet in diameter, with iron mullers shod with wooden shoes six inches high. On the average a ton and a half, dry weight, of sand and slime are put in a pan for a charge, and the time required for amalgamation varies from three to five hours after charging the quicksilver. Repeated experiments have shown that little is gained by running the pans over four hours. The same ore, treated side by side under the same conditions in pans, running respectively on four and six hour charges, gave a gain of one per cent. in favor of the six-hour

charge; but this slight advantage did not compensate on low grade ores for the limited capacity of the pans. Tests made on pulp while undergoing amalgamation showed that one hour after charging quicksilver, 74.66% of the silver was already taken up, and that in the succeeding hours 76.26%, 77.74% respectively, until the end of the fourth hour, when 81.04% was found to have been extracted.

After that period, nothing material was gained by prolonging the operation. For a long time, owing to the excellent quality of the ore, no auxiliaries other than steam and the iron of the pans themselves were needed by the quicksilver to effect amalgamation. Identical results were obtained with or without the use of chemicals. Little by little a change crept in, the milling percentage sank, the bullion became less fine, and sulphurets of the base metals made their appearance in the ore. Tests made with a view of determining the aid to be derived from the use of bluestone and salt, showed that in ore containing only seven per cent of its silver in the form of chloride, eighty-seven per cent of the silver present could be brought into combination with that element by the aid of these two "chemicals." The remaining thirteen per cent was apparently shut up in the base sulphurets and carbonates, and could not be chlorinated in the pans.

The Result of a Series of Experiments.

With these and other reagents, led to the adoption of 150 per cent of bluestone and 500 per cent of salt, the amount of silver in the ore being taken as 100 per cent, and by this means the milling percentage was brought back to its former standing. Still the bullion resulting left much to be desired. The question then resolved itself into this, how to make fine bullion from very base ores, and at the same time to keep up a satisfactory milling percentage.

Three methods suggested themselves, either to prevent the amalgamation of the base metals on the pans, or if that proved impracticable, to eliminate them from the amalgam before retorting, or during the melting. Although several metals were taken up by the quicksilver, in varying quantities, and so found their way into the bullion, still the only one that caused any serious trouble was lead, which was reduced by the action of the pans and amalgamated as readily as the silver itself. A noticeable feature in regard to the basing of this bullion was, that it became serious at the same time that wulfenite appeared in considerable quantities in the ore. Whether this mineral was the prime cause of the trouble I am not prepared to say; but we did not have the same difficulty when the percentage of lead was much higher in the ore, but in the form of cerussite or galena.

The ore was crushed through a screen corresponding to a 35-mesh wire cloth, and subsequently ground for one hour in the pans. By giving up the grinding in the pans, and by using finer screens in the batteries, but little of the lead was taken up; and by the use of lime, etc., in cleaning the amalgam, as already described above, the bullion was brought up to .970 fine; the remaining base, being principally copper, resulting from the bluestone used, was not of sufficient importance to extract. The extraction of copper, even after it has been amalgamated, presents no difficulties, as has been successfully demonstrated on a working scale at the tailing mills on the Carson River.

The Ores of the Tombstone District.

Carry a varying amount of gold, which in some bases is visible; but in others it only makes its presence known by the assays. At Charleston it is not positively known in what form this metal occurs, as it is never visible. Assays for the first six months of this year show that only 43 per cent or the total gold value of the ore was saved. This value, however rarely reaches two dollars to the ton. The amalgam is retorted in 15-inch top discharge retorts. About four cords of willow wood are consumed to the ton of amalgam. The firing lasts five hours, and the charge varies from a ton upward.

For bullion averaging .938 fine the loss by volatilization and skimming averages 7.55 per cent and the time required averages three hours twenty one minutes. The average weight of the bars is 2711 ounces, which require 43 pounds of charcoal and 20 pounds of coke. The average cost of milling for the past five months has been \$4.90 per ton. This amount was subdivided as follows:

Fuel.....	\$1.05
Chemicals (including quicksilver).....	0.77
Lubrication.....	0.04
Illumination.....	0.03
Castings.....	0.33
Supplies.....	0.16
Labor.....	2.52
Total.....	\$4.90

Cost of Labor in Reducing one Ton of Ore.

Crushing.....	\$0.52
Amalgamation.....	0.56
Power, pumps, etc.....	0.47
Foreman, etc.....	0.87
Tailings pit.....	0.11
Total.....	\$2.64

The loss in quicksilver to the ton of ore milled varies according to the grade and character of the ore, but averages about 1.3 pounds. About 0.11 cord of wood and 1200 gallons of water are consumed to the ton.

* This table has reference simply to a single month's run, or, what is the same thing, to the working of 1730 tons of ore.

Superstitions About Gems.

There are many curious superstitions and fancies concerning precious stones, and one of them, which, as it is elegant and fanciful in its absurdity, is perhaps worthy of mention in this place, includes almost the whole group of gems used for ornament. It is a Polish idea that every human being is born under the influence of some destiny, that the month of his nativity has a mysterious connection with this, and that when it is desired to make a present to one greatly valued and loved, a ring should be offered containing a gem expressing some such quality as the destiny would indicate. Each precious stone thus has reference to some particular month; and the following list is copied from a memorandum drawn up by a Pole many years ago:

January.—Hyacinth or garnet. Constancy and fidelity in every engagement.
February.—Amethyst. Preserves the wearer from strong passions, and insures peace of mind.
March.—Bloodstone. Courage and success in dangers and hazardous enterprises.
April.—Sapphire or diamond. Repentance and innocence.
May.—Emerald. Success in love.
June.—Agate. Long life and health.
July.—Carnelian and ruby. Forgetfulness, or cure of evils springing from friendship or love.
August.—Sardonyx. Conjugal fidelity.
September.—Chrysolite. Preserves from or cures folly.
October.—Aqua-marine or opal. Misfortune and hope.
November.—Topaz. Fidelity and friendship.
December.—Turquoise or malachite. Brilliant success and happiness in every circumstance of life.

Another curious superstition concerning gems is that the twelve Apostles were symbolized, each under some one. The list is curious, but one can hardly see the meaning of the allusion. It is as follows:

St. Peter—Jasper; St. Andrew—Sapphire; St. James—Chalcedony; St. John—Emerald; St. Philip—Sardonyx; St. Bartholomew—Carnelian; St. Matthew—Chrysolite; St. Thomas—Beryl; St. Thaddeus—Chrysoprass; St. James the Less—Topaz; St. Simeon—Hyacinth; St. Matthias—Amethyst.

The stones in this list are sometimes called the Apostle gems.

Indiana Capital in Arizona Mines.

[From our Traveling Correspondent.]

The Copperopolis Mining Company.

A few months since Wilson Collier, one of the enterprising Arizona prospectors, was in possession of several mining locations in Castle Creek district, about sixty miles from Phoenix. This is a genuine copper mining region. His showing of croppings was so favorable as to induce Thos. H. Kirby, W. B. Kline, Jas. Boice, Jno. M. Kirby and Geo. Kirby to furnish the capital requisite to develop the mines, for a half interest in the same.

So far everything has developed very satisfactory to all parties and a fully organized mining company is now carrying on the further developments. The capital stock issued 460,000 shares, with a provision to issue 40,000 more shares for additional working capital if required—the 60,000 already issued is sold for working capital but bought mostly by the stockholders. The other 400,000 shares are owned equally by the Indiana capitalists and Mr. Collier, that is, Mr. Collier has 200,000 shares in the company's stock, known as the Copperopolis Mining Company.

The officers are, W. B. Kline, President, and Thos. H. Kirby, Superintendent. They have been working lately twenty-five to thirty men on mines and roads, getting everything in readiness to receive the copper smelter, which was loaded on wagons at the railroad depot at Maricopa station. They got their complete outfit all at the Pacific Iron Works, San Francisco. They send with the furnace a thorough practical machinist and metallurgist to set up and initiate the operations.

The business management seems to be one of practical good sense, with a thorough management on a cash basis.

The ore contains such a percentage of iron as is supposed to enable them to flux with small amount of lime for flux. They will use Trinidad coke, and also some English coke from San Francisco. They have on Castle Creek a splendid site for smelter, making an easy down grade for their own ores, and accessible for custom ores.

B. W. CROWELL.

Phoenix, April 17, 1883.

Know

That BROWN'S IRON BITTERS will cure the worst case of dyspepsia.

Will insure a hearty appetite and increased digestion.

Cures general debility, and gives a new lease of life.

Dispels nervous depression and low spirits.

Restores an exhausted nursing mother to full strength and gives abundant sustenance for her child.

Strengthens the muscles and nerves, enriches the blood.

Overcomes weakness, wakefulness, and lack of energy.

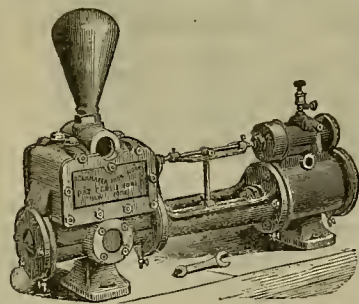
Keeps off all chills, fevers, and other malarial poison.

Will infuse with new life the weakest invalid.

37 Walker St., Baltimore, Dec. 28th. For six years I have been a great sufferer from Blood Disease, Dyspepsia, and Constipation, and became so debilitated that I could not retain anything on my stomach, in fact, life had almost become a burden. Finally, when hope had almost left me, my husband seeing BROWN'S IRON BITTERS advertised in the paper, induced me to give it a trial. I am now taking the third bottle and have not felt so well in six years as I do at the present time.

Mrs. L. F. GRIFFIN.

BROWN'S IRON BITTERS will have a better tonic effect upon any one who needs "bracing up," than any medicine made.



TATUM & BOWEN,

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Mining Companies.

Persons interested in Incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

Buchanan Gold Mining and Milling Company.—Location of principal place of business, San Francisco, Cal.; location of works, Tulumene, Tulumene county, Cal.

Notice is hereby given that, at a meeting of the Board of Directors, held on the 3rd day of March, 1883, an Assessment (No. 2) of Five (5) Cents per share was levied upon the capital stock of the Corporation, payable immediately. In United States gold coin, to the Secretary at the office of the Company, Room 3, No. 121 Post street, San Francisco. Any stock upon which this Assessment shall remain unpaid on the 21st day of May, 1883, will be delinquent, and advertised for sale at public auction and, unless payment is made before, will be sold on FRIDAY, June 1, 1883, to pay Delinquent Assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, J. A. MULLIVAN, Secretary.

OFFICE—Room 3, 121 Post Street, San Francisco, Cal.

ASSESSMENT NOTICE.

Seaton Gold Mining Company.—Location of principal place of business, San Francisco, California; location of works, Drytown, Amador county, Cal. Notice is hereby given that at a meeting of the Board of Directors, held on the 10th day of April, 1883, an assessment (No. 2) of one and one-half cent (1½) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Treasurer, A. Warner, at his office, No. 224 Kearny street, room 2, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 14th day of May, 1883, will be delinquent and advertised for sale, at public auction, and unless payment is made before, will be sold on Tuesday, the 5th day of June, 1883, to pay this delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, A. MARIN, Secretary.

OFFICE—Room 6, 528 California street, San Francisco, California.

NOTICE TO CONTRACTORS.

Sealed proposals will be received by the Brandy City Mining Company until May 1, 1883, to run a bedrock tunnel to its mining lands, situated at Brandy City, Sierra County, Cal., near the town of Camptown, Yuba County. Said Tunnel to be about 3,000 feet long, 6 feet wide and 8 feet high, with a grade of 5 inches to every 12 feet. Water Power furnished. Responsible parties only need apply. Privilege reserved to reject any and all bids. For further particulars inquire of

CHAS. ALLENBERG, Sec'y.,
630 Brannan Street, San Francisco, Cal.

Attention, Boiler-makers and Engineers!

Just Out! The Best Work of its Class Published!!
The Theoretical and Practical Boiler-maker.
By SAMUEL NICHOLS, Foreman Boiler-maker, Embrace all details of Geometry and Orthographic Projection as applied to Boiler-making; also to make, draw, design, and set out all kinds of Temple Work, as Ellipses, Cones, Truncated Cones, Oblique Cones, Frustums of Cones, Chimney Bottoms, Cylinders, Cylinder and Cone, Cylinder and Sphere, Cylinder connected with Curved Tubes, Cylinder and Angular Tube, Cylinder with Spiral Staircase, Hip Roof and Cylinder, Tubes, Angular Tubes, T Tubes, Taper Tubes, Curved Tubes, Conical Tubes, Double Conical Tubes, Flange Joints, etc., etc., of every kind, illustrated with 14 diagrams, including a full solution of all the problems relating to Boiler-making. The Cylinder, its sections, penetration, and development. Welding and Construction, Drilling, Punching, Riveting, Single and Double Riveted Lap and Butt Joints, with Stitches and Double Stitches. Diameter, Spacing, Strength, and Pitch of Rivets. Thickness and Pitch of Stays. On Locomotive, Marine, Cylinder, Multitubular, and Egg-shaped Boilers. Power of Boilers. Heating Surface of Boiler Tubes in square feet; the Lever Safety Valve, the Cylinder, the Sphere; Area of Fire Grates; Quantity of Steam required for an Engine; Flat Surfaces, Boiler Explosions; Practical Notes on Steam; Properties of Saturated Steam; Proportion of Boilers; Bursting pressure of Horizontal Wrought Iron Cylindrical Boilers; Collapsing pressure of Wrought Iron Cylindrical Tubes of varying thicknesses. Practical Rules, Instructions, and Measurements for Boiler-makers. Material for Boiler Construction; Weight, Strength, and Dimensions of Wrought Iron Boiler-plates and Iron Bars. Strength of Steel Plates, treatment of do.; Strength in Plates of different temperatures. Strength of Ropes and Chains; Properties of Metals; Weight of Wrought Iron Cylinders per lineal foot of any given diameter and thickness; Angle-iron Hoops; Diam. Circle and Area of Circle, with detailed calculations relating to Boiler Construction, to determine thickness of Boiler Heads, Cylinder Covers, etc. Measurement as applied to Boiler-making. Fuel Values. Combustion of Fuel, Evaporation of Water; Setting Boilers, Insulation, Boiler Scale Preventives, 35 kinds; Decimal Equivalents; Weight of Water; Expansion of Water; Squares, Cubes, and Roots; Fusing Points of Metals; Conducting Powers of Metals; Useful Definitions. Reference Tables (83 pages) for Boiler-makers, Engineers, Smiths, etc. 4 vol. 12mo, extra cloth. Bound price free to any address on receipt of \$2.50. Send for 125 page Illustrated Catalogue of 3000 Standard Books on every subject. Agents wanted, National Book Company, 73 Beekman Street, New York.

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Where you can get a crop every year; where you will make something every season; where you are sure of having a crop when prices are high; where you have a healthy place to live; where you can raise semi-tropical as well as other fruits; where you can raise a diversity of grain and vegetables and get a good price for them. Go and see the old Reading Grant (in the upper Sacramento Valley), and you will find such land for sale in sub-divisions to suit purchasers—at very low rates and on easy terms. There are 12,000 acres at from \$3 to \$30 per acre, including pasturage, vine, fruit land and grain land. Will sell the whole tract at a great bargain. Send stamp for map and circular to EDWARD FRISBIE, proprietor, (on the Grant), Anderson, Shasta Co., Cal.

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Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

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In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and permanently established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than any other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of inventions discovered here than any other agents.

Situated so remote from the seat of government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

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Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

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We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

DEWEY & CO.

United States and Foreign Patent Agents, publishers Mining and Scientific Press and Pacific Rural Press 252 Market St. Elevator, 12 Front St., S. F.

A New Street Railroad System.

Bridewell's Cable Road.

Most people on this coast have witnessed the operation of the cable railroad system in San Francisco, and are interested in new devices and improvements in that line. The Clay street cable road, the first built in this city, has been built ten years, and since that time there have been about nine roads built, and others projected. The working expenses are much less than horse-car roads.

R. F. Bridewell, of this city, has invented a new system of cable roads, and has six new patents and improvements, which he is about to introduce. They are described by the inventor as follows: First, the underground rail-bed; second, the automatic grip; third, the engine house machinery for propulsion; fourth, indicator and advertiser; fifth, the ways for turning corners and curves; sixth, the air brake and starter. The rail-bed is placed under ground, by making a channel of proper width and depth, in which are set iron frames about three feet apart, made with all necessary flanges for bolting the rails, which are under the surface about thirty inches, more or less. The gauge may be twenty-eight inches, more or less.

At the surface is placed two slot rails (as shown in Fig. 3), made like the letter L inverted. The rails form an even line on each side of the slot, which is laid even with the surface of the street. The trucks of the car run in the tramway, and the coaches above.

Every fourteenth frame is provided with a pulley for the cable to run on, over which is a man-hole, with a cast iron cover, bringing them about forty-two feet apart along the street. A pipe is run along the bottom of the tramway, which is connected with the water tank at the engine house, or the city main; on this pipe, under each man-hole, hand wheels, stop cocks and nozzles are placed, which are used in washing out all debris, as the bottom of the tramway is made like a sewer, and is connected with the same at all depressed places on the road. The pipe is arranged so as to connect with the furnace at the engine house, and during the winter, when the snow falls, the water will be drawn off and hot air forced through the pipes, to prevent the snow from freezing in the tramway. In the

or forward, the move is the same. The cars are also provided with other brakes.

The cars are provided with two endless bands, placed in the top of the car, which are made to

When the car is stopped on the curve, the cable goes straight through the grip, without touching the side of it. When the cars are started the grip will be closed on the cable, and

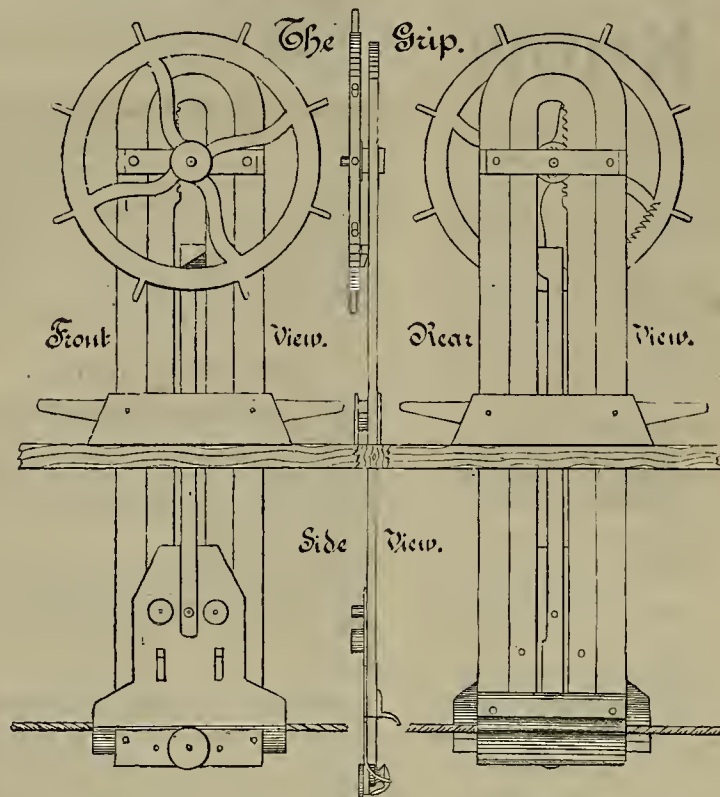
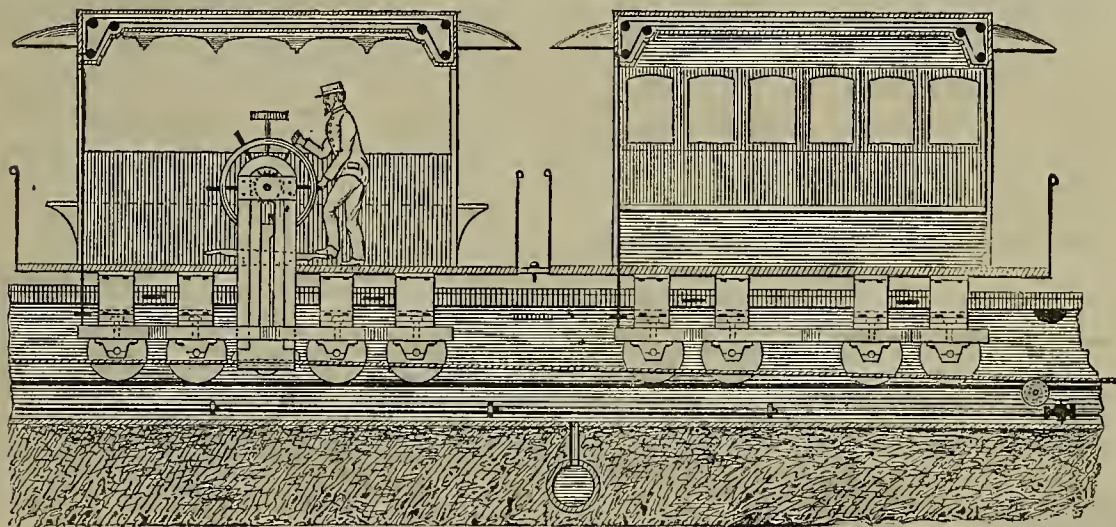


FIG. 6 - BACK AND FRONT VIEW OF GRIP.

receive cards, one half of which will have the names and numbers of all the cross streets to be crossed on the road. The others will be advertisements. When the street is to be crossed,

goes on as it would on the straight part of the road. The curves are turned as easily as the straight part of the road, as the cable is first pressed out of the groove of the pulley, and



R. F. BRIDEWELL'S CABLE RAILROAD SYSTEM.

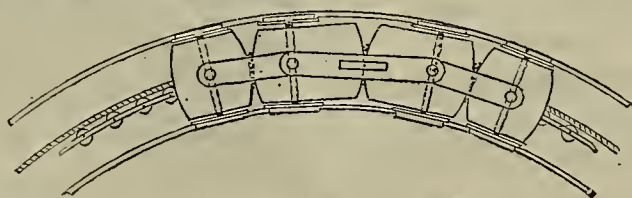
tramway, on each side of the rails, are spaces for the use of all telegraph, telephone and electric wires. This is provided in order to take all wires and poles, as well as rails, out of the street.

To build the engine room, the street must be excavated and iron beams are placed, to be covered over with brick. The tramway is carried over the beams in a straight line. The propulsion is endless clamping jaws, upon the endless cable, with steam engine motor power. The cable is carried through the tramway by the clamping jaws, which open and shut automatically, grasping the cable very lightly, but will not let it slip. The jaws are lined with any kind of material that is suitable, and which will not injure the cable. (See Fig. 4).

The grip works automatically over all cross cable roads, without the aid of a driver. It can be stopped over the engine house, and started as readily as on any part of the road. It will cross its own cable, or any other.

The air brake is on the trucks. When the driver wishes to stop his car, he places his foot upon the treadle, and that releases the cable and engages the air brake, which stores up the force the car had while in motion, which is used in starting it, by shoving a lever the direction the car is to be moved. It will start the car either back or forward. The car has much force to be overcome in stopping. Whatever that force is, it is not lost. In starting, the brake is not dependent upon the stored air, but has a vacuum which is acted upon by the pressure of 14.7 lbs. to the square inch, and the lever is changed, so that one pound saved in stopping will give two in starting. The levers on the grip and air brake are always right-handed. It will make no difference if the car is turned around, or if it is to be run backward

the car comes in contact with a rack, which is placed on each side of every cross street, and that engages with a gear wheel in front of the trucks, and the wheel is turned around it, being arranged with a lever and a rod passing up through a pipe to the helts, draws up the hand and brings the name or the number of the street opposite an opening which is over the doors of the car. When the name of a street is to appear, notice will be given by the ringing of a bell. When the street is crossed, the name will disappear, and the next in order being an ad-



ARRANGEMENT AT CURVE.

vertisement, will present itself to be read by the passengers until the next street is reached, and so on, all day and night. As the lamp hangs in the center of the car, it will show as well by night as day.

Fig. 6 shows the curve, which is to a scale three times quicker than that ordinarily allowed to turn street corners. The curve is provided with a circle of wheels to carry the cable. The car trucks have a carriage, which is bolted to the trucks, and the grip works on the inside. The carriage has wheels on each side of it, and rollers at each end, for the cable to play against. When it starts around the curve, the cable is kept straight in the carriage, on the curve.

cars will have to be turned around at the end of the road by running them on a turn table. Where the side tracks turn out, the cable will have to run under a pulley to press it down, so as to let the wheel pass over the cable. Single rail tracks can be made much cheaper, as one rail can be used on the bottom, and have side wheels at the top. These roads, for country towns, can be made and operated on a very cheap scale.

It may not be out of place to insert a few remarks by the inventor upon the advantages that this system has over all other street railroads: The road-bed being under ground, the rails, which are made of steel, are not exposed to the weather, and the abuse by heavy wagons and drays abrading them. They are free from all mud, rocks or trash of any kind, and the cars will run much smoother, as the joints will remain even. The cars being low, and close to the ground, elderly people will be able to enter and leave them quite easily. The safety to pedestrians will be greatly increased, the wheels being under ground cannot possibly run over them. The cars are provided with indicators, showing all the names of the cross streets in large letters, over each door of the car. The power saved in operating, and the daily wear of the cable, is something that deserves notice by stockholders. The cost to build a road on this plan is much less than others. The rails are not required to be over eighteen pounds to the yard, in place of thirty-six or forty-five pounds, as now required for flat rails on the street. The advertisements will pay, and the space for wires is worth considerable. The corners and curves are turned without jarring or jerking them. The cars can run up grade around the curve; the contour of the street is never lowered or raised in order to obtain a momentum to carry the cars around them.

Further information can be obtained by addressing the inventor.

TITLE TO MINING CLAIMS.—In the case of the Pacific Coast M. and M. Co., against James Spargo et al. and L. Fick et al., Circuit Judge Sawyer has rendered an opinion holding plaintiff entitled to the mines and lands on Deer Creek below Nevada city from which it had been ousted by defendants. In December, 1874, certain parties entered at the United States Land Office lands which were afterward secured by patent and subsequently sold to plaintiff. Min-

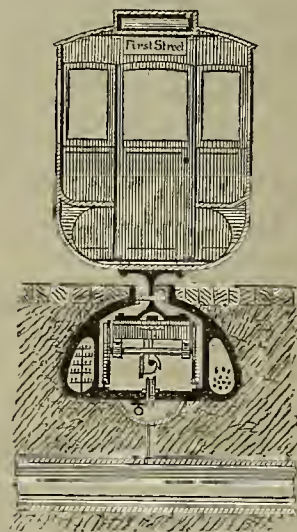


FIG. 3 - SECTIONAL VIEW.

ing lodes were located and also conveyed to plaintiff. The defendants were charged with entering these lands by means of a tunnel beneath the surface, extending from a point outside the boundaries. The patent to plaintiffs contained the clause, "subject to any vested and accrued water rights for mining, agricultural, manufacturing or other purposes." When the patent issues, Judge Sawyer holds it covers everything embraced in the land to which no prior right attached. The two cases are similar and the decision is against defendants in each case.

SUTRO TUNNEL.—The total mortgage indebtedness of the Sutro Tunnel Co. is \$982,962.52, exclusive of interest, which on January 1 last amounted to \$234,181.80. During the past three years, 2,920 feet of the main tunnel have been retimbered. This ground stands very well and requires but little attention. But many of the timbers which were put in before that time are decayed and will have to be replaced during the coming year, including those within the 224 feet of heavy swelling ground near the Combination shaft connection. There are also about 600 feet of ground which is constantly swelling which should be retimbered and about 3,000 feet of track should be reggraded. The receipts and disbursements for the year to March 1 were as follows: For royalties, \$47,627.84; receipts under mortgage, \$39,040.00; other sources \$10,583; cash on hand, \$2,002.12; total \$99,212.96. The disbursements were \$98,077.63 for all expenses of operation.

COLONEL JACK HAYES, the well-known Texan ranger, and founder of the City of Oakland, in this State, died at his residence near Piedmont, Alameda county, Saturday last.

Metallurgy in Arizona.

Working Ores at the Silver King Mine.

[Written for the MINING AND SCIENTIFIC PRESS.]

Final is not so lively now as it was in the flush days of the Silver King mine, from which, and the connected works, it has always derived its chief support. The Silver King mine, though said yet to contain an immense body of ore, is far less rich than in former times, as is shown by the weekly reports, by the output, and by the greatly diminished reserve fund. The S. K. reduction works consist, at present, of twenty stamps and twelve Frue concentrators in operation, with a roasting and leaching plant idle. The concentrators are exported. Roasting and leaching were adopted a few years ago for the treatment of a portion of the ore which did not admit of concentration, on account of containing heavy spar. Prior to this, as at present, concentration alone was carried on.

The Ore Roasted was Rich, and otherwise well adapted to the leaching process. It was easily roasted in cylinder furnaces of the class known as the Pacific chloridizing furnace, but arranged with a fire-box at each end for the purpose of more equally heating all parts of the charge. The fire-boxes were used alternately, at intervals of from one to two hours, the unused one forming, for the time, a part of the flue. The roasting of a charge of five tons of ore, with about ten per cent of salt occupied from ten to fourteen hours. The character of the ore gradually changed until a charge of three tons required from twenty-four to forty hours roasting. At times it was impracticable to roast the ore well in the usual way, unless about seven per cent of sand were added. This gave very fair results, and by counteracting the tendency to sintering reduced the roasting time considerably. Another method was to roast without salt to complete oxidation, and then to chloridize by means of salt and copperas. This plan gave high solubility, and reduced the time of roasting a four-ton charge to twenty-five hours; but the roasted ore was leached with some difficulty owing to its not admitting of rapid percolation.

The Roasting was Very Costly.

As well be understood when I say, that on taking charge of the works, I found no less than nineteen men employed between the battery and the leaching vats, that is to say nineteen men engaged in drying, repulverizing, roasting and elevating from nine to ten tons of wet crushed ore per day of twenty-four hours. A cord of wood, costing from seven to eight dollars, was consumed per ton of ore.

The force was soon reduced to seventeen men, but no further diminution was feasible owing to the prevalence of the eight-hour system, and to inherent defects of the plant. The ore treated also was less rich than formerly. The presence of a large percentage of zinc blende caused a considerable loss of silver by volatilization amounting, despite the constant use of steam in the furnaces, to about eight per cent, to which was added a large loss by dusting during the repeated handlings to which the ore was subjected, and by deposition among the embers in the unused fire-box which formed the connection between furnace and flue.

Under these circumstances the treatment of this class of ore was discontinued, which caused a very material reduction in the working force of the mill, and a corresponding one in the amount of money disbursed monthly, which latter circumstance so disgusted the good people of Pinal as to induce some of the less wise among them to make a feeble and futile attempt to frighten the metallurgist from his post. The reduction of the reserve fund is partly to be accounted for by

Important Improvements Made

During the past year, both at mine and mill. Nearly last, but by no means least of these, is the introduction of a rock breaker, the immediate effects of which were a still further reduction of the pay roll, and, which was more im-

portant, an increase of fully twenty per cent in the crushing capacity of the stamps.

The ore treated during the last six months, at least, was peculiar in this respect, that by far the greater part of its value consisted in native silver dispersed through quartz, heavy spar, "altered porphyry," zinc blende, and galena, with a small proportion of pyrites, and some

a notable quantity of heavy gangue matter of at least as great specific gravity as the zinc blende and copper pyrites. The headings were required to be worth \$1,000 per ton by assay.

Under such conditions it would be absurd to expect any machine to yield extremely poor tailings by a single operation. Repeated experiments, by the most careful vanning, demon-

strated the impossibility of obtaining a rich product from the tailings, unless they were previously reground; but they also proved that sixty-five per cent at least of the value of the tailings was contained in from ten to twelve per

cent, confirmed by trials in a pan which would contain about 300 pounds of ore, that the original ore or any of its products, headings, tailings or middlings, could be worked by amalgamation to a higher percentage of its assay value; the ore yielding about seventy-five per cent, headings eighty-seven to ninety-three per cent, middlings seventy-five to eighty per cent, and tailings fifty to sixty.

Under these circumstances it would seem that the better way in which to treat the ore would be to concentrate so as to put ten or less tons into one, and amalgamate the product; or, to concentrate the rich portion as was done for exportation, and reconcentrate, on a cheaper and more capacious machine, producing an inferior grade of material for amalgamation.

The results.—In the latter way a net profit of from \$3,000 to \$5,000 or more per month would be made, an advantage which one would suppose even a rich company could not afford to overlook; but although these facts and suggestions were laid before the management some months since, the only apparent result, excepting the two ripple sluices, has been that the company had no further use for the metallurgist who gave them the information, and who was kindly permitted to resign without explanation or cause assigned. This incident will probably stimulate the ambition of some other metallurgist who desires to advance the interest of his employers while gaining some credit himself, to undertake uncalculated labors, discover an important fact and—keep it dark.

C. H. AARON.
Pinal, Ar., April 15, 1883.

ASTONISHED MINERS.—Down in the Flowery district, day before yesterday, says the Virginia Enterprise, some miners, who were prospecting about two miles north of the Lady Bryan mine, had quite an astonishing experience. They were drilling a hole into a quartz vein on the side of a mountain, preparatory to put in a blast. One of the men was holding and turning the drill while the other was striking. Suddenly a blow of the hammer sent the drill out of sight. Instantly a stream of water spouted up to the height of forty or fifty feet. The water came out the full size of the drill hole, and spouted for over an hour, when it gradually failed and ceased to flow. The men finally put in a blast, and blowing off the top of the quartz vein, discovered some four feet below the surface, a large crevice or cavity, which extended up the hill as far as they were able to probe it.

"GO OUT AND DIG."—A Wood River judge, in response to a man who claimed that, while willing to work, he was unable to find any work to do, replied: "You are a good miner and can therefore prospect. Go out in the hills and dig! The chances are that before your grub gives out, if you work assiduously, you will strike a good prospect that will keep you supplied with money until you can open and sell your claim!"

A COUPLE of eagles that had made their nest on a cliff of basalt, to the west of Mount Davidson, in the early days, disappeared in 1865. A few days ago they returned and commenced the work of repairing their old nest. The miners hail their advent as a good omen—luck for the Comstock.

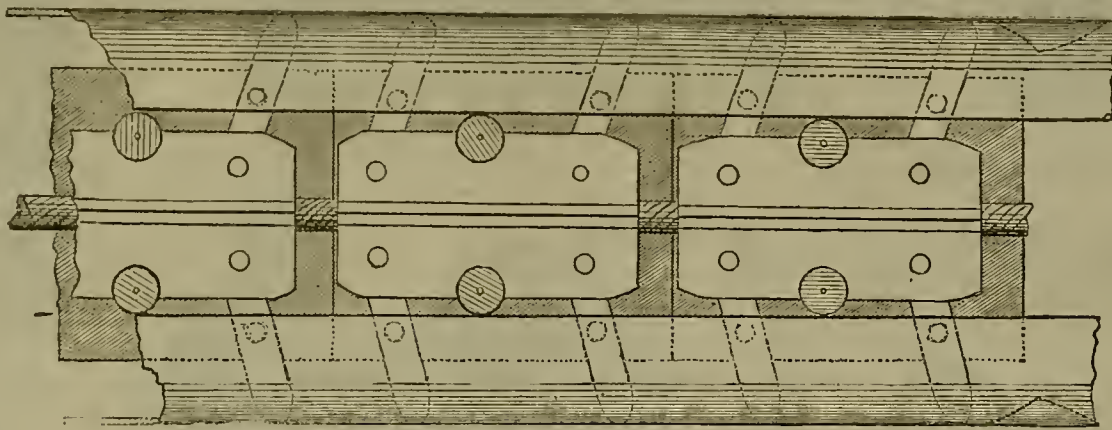


Fig. 4.—ENGINE HOUSE CLAMPING JAWS

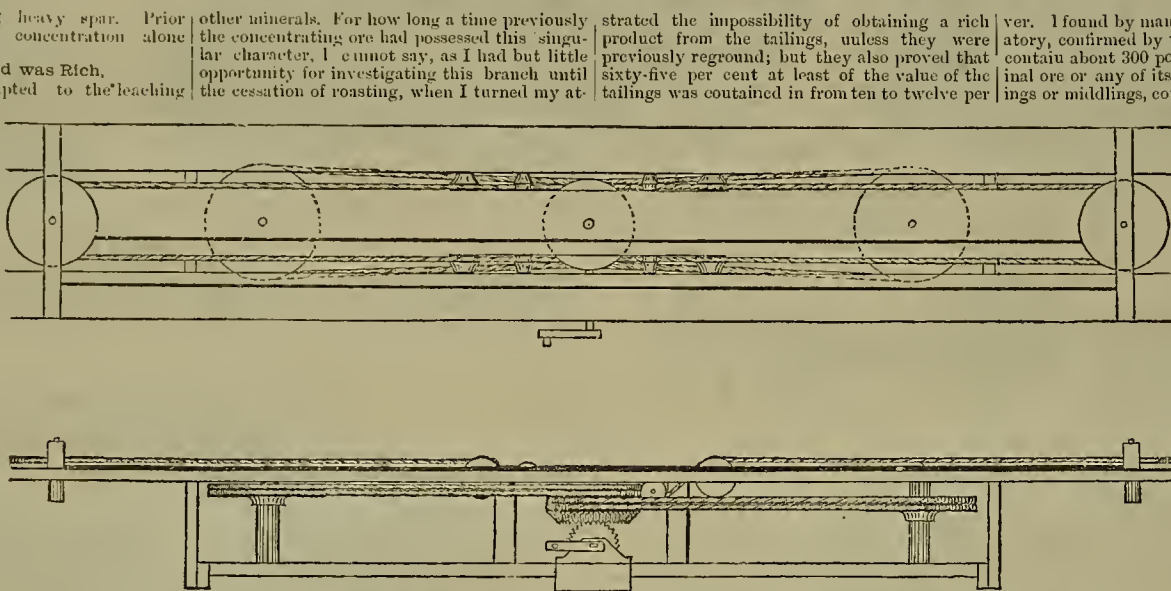


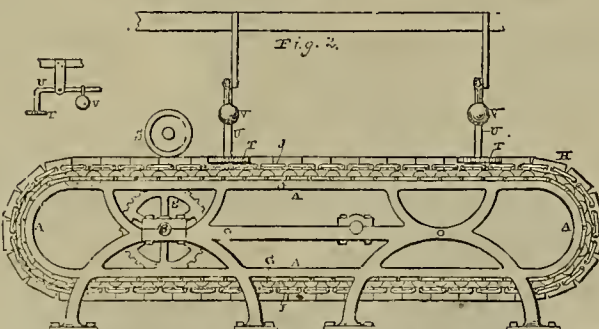
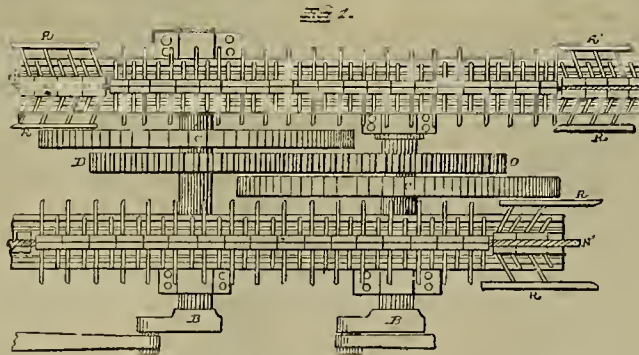
Fig. 5.—PROPULSION POWER, ALSO A REGULATOR FOR GIVING A FASTER OR SLOWER SPEED OF TRAVEL ON DIFFERENT POINTS OF THE ROAD.

teution to it with the object of improving the Work of Concentrators.

The concentrators saved from eighty to eighty-four per cent of the value of the ore. It was from no fault of the machines or their man-

agement that a better result was not secured, but was due to the onerous conditions under which they worked. The ore, as stated above, was charged with native silver. It was crushed somewhat coarsely through a number two needle-punctured screen—a little coarser than a thirty-mesh wire sieve, I believe. It contained

cent of their weight, in the form, chiefly, of native silver enclosed by particles of zincblende, copper pyrites and heavy gangue. This material (middlings) assayed from \$30 to \$50 per ton. The tailings also contained a very small



Figs 1 and 2.—TOP AND SIDE VIEW OF ENGINE HOUSE.

quantity of fine black sulphurets assaying about \$140 per ton when cleaned. The only attempt yet made to save this valuable material was to put in two lengths of wave-line riffle sluices, partly zinc-lined, partly blauketed. This was not done under the writer's direction, and was but a poor attempt. The wave-line riffles were

not so good as plain riffles for the heavy sand containing native silver, while the blankets, which would catch the fine sulphurets in a plain sluice, could only do so in these at higher points, the depressions being quickly filled by the heavy sand, over which the fine sulphurets glided, not sinking through them. Of course, two lengths of sluices were quite insufficient for the work of saving some six or eight tons of stuff per day, and they required the labor of two men, shift about. The work could be better and more cheaply done by automatic machinery. With the crude appliance described from one to one and a half tons of middlings were saved daily, while four times that quantity went, and still goes into the creek, where are some thousands of tons of tailings which the company will not save and will not sell, and which the first summer freshet will sweep to utter loss. As a result of the fact that the value of the ore was chiefly native sil-

Arizona in General.

Said Baron Alexander von Humboldt, "The wealth of the new world will be found in Arizona and New Mexico." Arizona, "the land of the beautiful zone," or "the land of the beautiful maiden," has hitherto been almost inaccessible. But the Atchison, Topeka and Santa Fe railroad has now opened the door of this wonderful territory to the civilization and capital of the east. The Territory of Arizona is bounded on the south by the Republic of Mexico, on the east by New Mexico, on the north by Utah, on the west by California. Colorado touches it at the extreme northeastern corner, and Nevada impinges upon its northwestern boundary. Speaking with exactitude, Arizona extends from 109° to 114° 25' west longitude, and from 31° 37' to 37° north latitude, which corresponds to a width and breadth of nearly 325 miles each, and an area of 113,916 square miles, or of 72,906,240 acres. New York, Pennsylvania, New Jersey, Maryland and Delaware could be set down inside this square without crowding each other. Until 1863 this vast area was a part of New Mexico, but in February of that year was made a separate political division. Arizona is essentially mountainous, and a list of the ranges chopping it up like the ocean waves under a cross wind would be a very long one. The general "dip" of the land is to the southwest. In the northern and eastern parts the plateaux are nearly 6,000 feet high, while to the south and west they are but a few feet above the level of the sea. This grand slope is one

Vast Network of Mountains.

Starting at the southeast corner and going west, south of the Gila river, the principal ranges are as follows: Peria, Pedrogoso, San Jose, Hauchuca, Dragoon, Chiricahua, Peloncillo, Pinalena, Galiuro, Santa Catarina, Tortililla, Tucson, Santa Rita, Atascoos, Cababi, Quigotoa, Santa Estrella, Sierra de la Nari, Sierra del Ojo, and Mohawk range. Between the Gila river, which crosses the Territory from east to west across its southern third, and the Atlantic and Pacific railroad, which bears westward midway between the Gila and the northern boundary line, are to be found the Big Horn, Eagle Trail, Plumas, Mt. Hope, Juniper, Black Hills, Verde, Mazatzal, Magallon, White, Apache, Gila, Salt River and Bradshaw mountains. The northern third contains the Virgin Range, Hurricane Ledge, Shearwitz Mountains, Buckskin Mountains, Calabasa Mountains, Rabbit Hills, and the Vermilion cliffs. The drainage of this network of mountains is almost perfect. The course of the Gila has been alluded to. Besides this river, which is over 500 miles long, there is the famous Colorado which, as the San Juan flows westward from Colorado, unites with the Little Colorado at White Bluffs, and thence as the Colorado flows southwest and then south, forming the Nevada and California boundary lines, and receiving in its course the Pahria, Virgin, Williams Fork and Gila rivers. The San Pedro, San Carlos and Verde are the principal tributaries of the Gila. That Arizona is well wooded the following names would seem to signify: Navajo Forest, Black Forest, Colorado Forest, Cocoonio Forest, and so on to the end of the chapter. Open plains are found in the southwestern and southeastern sections. Though

The Climate of Arizona

Is essentially a warm one, yet the air is dry, pure and remarkably salubrious throughout the greater portion of the year. It is what might be called semi-tropical in the southern portion, where for two or three months of the year the heat is somewhat excessive, though cases of sunstroke are unknown. The winters are delightful beyond imagination by northern people. "In winter," says J. Ross Browne, "the climate near Yuma is finer than that of Italy. It would scarcely be possible to suggest an improvement." In the mountains of Western Arizona, for the greater part of the season the higher peaks are white with snow, rendering the pure, dry air deliciously cool and enjoyable, especially at night, when a good supply of covering is always in demand for the sleeper. Within a distance of 200 miles from north to south a greater variety of climate can be enjoyed than between Maine and Florida on the Atlantic coast. The climate of southern Arizona is superior to that of Florida, in that it is warm and at the same time dry. As soon as this great sanitarium is fully known it will become for winter what Colorado now is in summer—a great resort for invalids. From the middle of June to October, however, the heat is intense, but travelers say that, even with the thermometer at 120 degrees, sunstrokes are of rare occurrence. This is due to the rarity of the atmosphere. The average rainfall at Fort Mojave is but little over five inches, distributed through August, December, February and June. At Camp Grant, which is said to be in all respects a medium climate, the diurnal variations of temperature are from fifteen to thirty degrees; the monthly range being about twenty-seven degrees, and the yearly extremes of heat and cold thirty-four and ninety-six degrees, respectively. There are, annually, about sixty-five days of rain and hail, and three of snow. At Camp Verde the temperature ranges from five degrees to 113 degrees, and the average rainfall eight inches. At Camp Lowell, seven miles east of Tucson, the diurnal range is sometimes seventy degrees. Persons afflicted with pulmonary complaints experience speedy relief in this warm atmosphere, and many won-

derful and well-authenticated cures of this nature are reported.

The Scenery is Truly Charming.

It is not so rugged, perhaps, as Colorado, but it is, if possible, more pleasing. Instead of having a continuous mountain chain running in a given direction, it has isolated peaks and detached sections coming up out of the plain apparently at random. Yet, while her landscapes are thus beautiful to a degree that admits of no rivalry, Arizona has her towering peaks and deep canyons surpassing those of any other locality. The canyons on the Colorado river are some of them 6,000 feet, or more than a mile, in depth. Mention should be made of the valleys of Arizona. They are numerous and fertile. In the valley of the Verde, settlements have been made to a considerable extent. Williamson's valley, near Prescott, contains not less than 500,000 acres, together with 300,000 acres of adjacent foothills, well furnished with bunch grass. Around Mount Hope, in Yavapai county, there are scores of beautiful valleys containing from 40 to 400 acres of land each, in fact, wherever a river runs, there, at some portion of its course, may be found as lovely depressions as exist anywhere in the United States. It is estimated that there are about 2,800,000 acres of land in the Territory, of the very best quality, with sufficient surface water near at hand to properly irrigate. At least 10,000,000 acres more, it is said, can be reclaimed by the use of artesian wells. As compared with Mojave county, in Arizona, the eastern portion of southern California and southern Nevada, in the same latitude, have the following relative standing: Agricultural, irrigable and arable, California and Nevada, two per cent.; Arizona, twenty-five per cent. Timber, California and Nevada, six per cent.; Arizona, ten per cent. Grazing, California and Nevada, eighty-eight per cent.; Arizona, thirty per cent. Baren, California and Nevada, four per cent.; Arizona, thirty-five per cent.

The following agricultural divisions of Arizona are of interest: 1. The Colorado river country. 2. The valleys of the Gila and tributaries. 3. The Santa Cruz valley, and certain parts of Pinal and Pima counties. 4. The Colorado-Chiquito. 5. The country around Prescott. 6. Mojave county.

As far as known Arizona is abundantly supplied with hot springs. They have been noticed in the Grand Canyon of the Colorado, also on the Gila and Prieto rivers, on the Mesa near Camp Lowell and near Tubac. The Monroe Hot Springs, on Castle creek, sixty miles south of Prescott, are most widely known. The temperature of the water at the springs is 160 degrees, but two yards below it cools to 130 degrees.

In Population and Wealth

Arizona is rapidly advancing. According to the census of 1876 the population consisted of 30,191 whites, besides 25,000 Indians. Since that time the increase has been rapid, and the census, if taken to-day, would probably foot up nearly 50,000. What were considered the wild dreams of Cremony, in his "Life Among the Apaches," published a dozen or so years ago, are now being realized; and the almost miraculous opening of the country, and the continuous discoveries of rich mineral deposits, lead to the belief that the next ten years will see an inflow of immigrants as yet unparalleled in its wonderful history.

The Principal Arizona Towns

Are Yuma, Ehrenberg, Prescott, Florence, Tombstone, Benson, Tucson, Wickenburg, Phoenix and Globe. Yuma is located near the junction of the Gila and Colorado rivers, and is 466 miles from Deming, N. M., on the Southern Pacific railroad. It was founded as a mission in 1700 by Father Kino. The population is now probably over 2,500. Ehrenberg is 130 miles above Yuma, on the Colorado river, and is a town of nearly 1,000 inhabitants. Prescott, established in 1864, and county seat of Yavapai county is a handsome, homelike city, situated in a small valley, surrounded by mountains, and boasting of a population exceeding 4,000. The capital of the Territory, first located at Prescott, was taken in 1867 to Tucson, but in 1877 was taken back to its first love. Phoenix, the county seat of Maricopa county, is situated two miles north of the Salt river, and is the business centre of a highly productive valley. It was founded in 1868, and contains 800 inhabitants, half of whom are Mexicans. Wickenburg, a village of 300 people is a mining town, situated at the forks of the stage road to Prescott from Ehrenberg. Florence, the county seat of Pinal county, lies on the Gila river, 225 miles from its mouth. It is the centre of the rich agricultural valley of the Gila, and contains about 1,800 people, evenly distributed between Americans, Mexicans and Spaniards. Globe is a recent vigorous outgrowth of mineral discoveries in the mineral district of that name, ninety miles northeast of Florence, on the Pinal Creek. The early origin of Tucson cannot be easily traced, but it is thought to have been founded but a few years after Santa Fe, in 1580. Up to 1800 it was a mere presidio, or garrison, with a population of a thousand souls. In 1856 it is described as containing only 400 inhabitants, while to-day it supports nearly 5,000 people. The future importance of Tucson is easily predicted. Tombstone is a recent "outpost." It was founded and named by a miner who made a wonderful strike contrary to the gloomy predictions of friends, who asserted that he would find his tombstone in the district to which he was going. It is the county seat of Cochise county, and is

situated twenty-seven miles southeast of Benson, on the joint line of the A. T. & S. F. and Southern Pacific railroads, being easily reached from Benson by a daily line of Concord stages. The buildings of the town are of a superior order, and church and school privileges exist in abundance. The present population is estimated at 4,000. Benson is an important station on the roads mentioned, and will increase in commercial importance with the opening of the road from that point south to Guaymas.—From River to Sea.

Early History of Mohave County.

Maynard District.

The Mohave County Miner gives an interesting sketch of the early history of the county:

In the early part of the year 1863, John Moss, William Furlong, Wm. France and two other men named Walton and McCall, prospected through the Union Pass range, which lies on the east side of the Colorado river. At that time the only settlement in Mohave county was at Hardyville on the river, some nine miles above where Fort Mohave now stands. The result of this trip was the location of the celebrated Moss mine by John Moss, one of the party. This is a gold ledge about fifty feet wide and averages about 814 across the entire ledge, and was the first location made in Mohave county. The wonderfully rich specimens of gold taken from this mine created a great excitement in San Francisco and resulted in the sale of the mine for \$90,000.

Of this first prospecting party none are alive at the present time. Billy France was lost a year or two after in the mountains between Mineral Park and Cedar and perished. McCall was killed by the Indians at Union Pass in 1866. John Moss died in California a year or two ago.

The discovery and sale of the Moss mine resulted in the formation of another prospecting party by San Francisco mining men, who sent out a party of ten or twelve under the guidance of John Moss, among whom were Howard B. Coit, for many years since the caller of the San Francisco stock exchange, and Lieut. Evans of the California volunteers. This party prospected through the Union Pass, Cerbat and Wallapai ranges of mountains in the fall of 1864 and finally located on the western slope of the Wallapai mountains, where they formed a district under the name of the Wanba-Yuma district, which included in its boundaries the entire Wallapai range, of which Maynard district, the subject of this article, now forms a part. The party made several locations, but were driven out by the Indians after working two or three months.

In the year 1866 the same party came back again and worked about three or four months on two of their locations, the Pride of the Pines and the Florence, which are some six miles north of the copper mines now owned by H. A. Owens, J. A. Smith, John K. McKenzie and others, when they were again compelled to leave the district by the Indians, who made Mohave County from this time up to the year 1870 too hot for white men to live in except at the settlement at Hardyville on the river. From this time little or no mining was done in the county until the year 1870, when several small parties ventured into the mining country again and formed settlements at Mineral Park, Cerbat and Chloride. In this year Lieut. Wheeler first visited this county and surveyed the site of the present Fort Mohave and the Indian reservation.

Having been detailed by the U. S. Governor to examine portions of Nevada, Utah and northern Arizona for the purpose of reporting on the geological and mineral formation of the country, Lieut. Wheeler again visited this county in the fall of 1871, and camped for several days in the main wash running into the valley from the Wallapai mountains, which has since been called Wheeler's wash. With this expedition, which came from Nevada by way of Death Valley and El Dorado canyon, came also Major Wheeler, a brother of the Lieutenant, and a party of prospectors, who were outfitted by San Francisco capitalists, among whom were F. L. A. Pioche, Isaac Friedlander, A. J. Bowie, F. R. Simonson, Frank Soule, and others whose names appear on the older locations made by this party. Major Wheeler and his party at once proceeded to business on their arrival in Wheeler's wash, by building a house and forming a permanent camp, which they christened "Bottle Camp," from the number of medicine bottles they had with them, we presume. They at once formed a new district, under the name of Maynard district, adopted a set of by-laws and regulations, and elected Francis Klett as Recorder. Among those who were present in the district at its formation, the following are the best known, viz.: E. Martin Smith, Francis Klett, Lafayette Maynard, from which the district was named, John Kohler, W. McGeary and D. W. Lockwood.

The first location made by the party was named the Wheeler ledge, and there are some 10 names signed to the notice of location. The boundaries of Maynard district are as follows: Beginning at a point distant 10 miles due north from the Lyons ledge; thence due east seven miles; thence due south 20 miles; thence due west 14 miles; thence due north 20 miles; thence to the place of beginning.

The general formation of Maynard district is in granite mostly, in some places feldspathic granite; the ledges large and well defined, varying in width from two to 20 and 30 feet, the ore streak measuring from six inches to six feet. The ore is generally chloride and carbonate on

the surface, changing at a depth of 50 or 60 feet to sulphuret. Considerable galena ore is found in this district, notably in the Antelope mine, which will be described hereafter. The ores of this district are rich in ruby and antimonial silver, and vary from 50 ounces to 1,500 ounces. There is a streak of ruby-silver ore in the American Flag mine about four inches in width, which will average over 1,000 ounces to the ton. Considerable work has been done on some of the mines of this district, at a vast expense, which goes to show that the mines are rich, for this work has been done during the past 10 years, when nothing less than \$150 ore would pay to mill in this county.

The most prominent mine in this district is the American Flag, owned by Messrs. Richards, Corin & Co. There has been more work done on this mine than in any other in this portion of Mohave county, and the mine is opened up in better shape and has not been gutted out like a great many of our mines here. Everything has been done with a view to the future working of the mine and not with a view of getting out everything in sight and leaving it. On this mine, which was located in October, 1874, the main shaft is 250 feet deep, and there are two tunnels, one 691 feet long, tapping the shaft at 250 feet, and another 603 feet long. Up to the present time there have been about 3500 feet of drifts, tunnels, winzes, etc., run in this mine, which has produced about \$130,000. The ore from this mine is a sulphuret, carrying pyrites of iron, some zinc blend and a slight percentage of lead, the silver being antimonial and ruby. This is one of the most promising mines in Mohave county and great results are expected from it in the near future.

Another good mine in this district is the Mississippi, owned by Frank Hamilton, with a tunnel about 420 feet long and a shaft 250 feet deep, at the bottom of which the pay streak is fully three feet wide and will average over \$50 per ton. Thirty tons of the best ore from this mine milled \$900 per ton at the Mineral Park mill.

Another prominent mine is the Antelope, owned by B. H. Spear and Wm. Freeborn. This mine is opened up by about 400 feet of tunneling and a shaft 100 feet deep. The ledge is five feet wide of carbonate ore on the surface carrying a good percentage of lead. Below the water level the ore changes to a heavy sulphuret. Ore from this ledge will assay from \$25 upwards. Considerable of the best ore has been hauled to the mill at Mineral Park and all of it went over \$300 to the ton.

Still another prominent mine and one of the first locations in this district is the Dean mine, with a strong, well-defined ledge twenty feet in width, with hard blue granite walls on either side. On this ledge there is a shaft 140 feet deep with five feet of ore at the bottom which will average fully \$80 per ton. There is also a tunnel 600 feet long which enters the ledge at a depth of 400 feet, showing similar ore, in extent and value, to that found at the bottom of the shaft. This valuable property is now owned by John E. Ryan, who has no superior as a miner in this county, and who has spent a large amount of time, money and muscle in getting this mine into its present shape.

Other valuable properties in this district are the Southern View, owned by Gatewood & Co.; the Grant & McGeary mine, owned by Tubman Ayres; a group of mines, owned by Harley Fay and T. L. Ayres, and some good claims owned by John Barry.

These are only a very small portion of the

Ledges Found in this District.

And a great many others have been located by various other parties which, with a little work, will develop into as good mines as those referred to above. This district contains an abundance of wood and water, and a large portion of it is covered with heavy pine timber from which most of the lumber used in building and mining in this county for the past ten years has been cut. The district includes in its boundaries the highest peaks of the Wallapai range, rising 9,000 feet above the sea level. The high altitude of the district makes the climate perfectly delightful, healthy and invigorating, and though the miner may find more snow than he wants in winter the cool summer days will more than compensate him. Mining timbers of any size can be procured at the sawmill near the Dean mine at very reasonable rates.

To the prospector in search of new fields to display his enterprise and energy Maynard district presents attractions not equalled by any in the Territory of Arizona. Containing as it does a large tract of mineral land which has as yet been scarcely prospected, the great size of its ledges, the high grade of its ores and the facility with which they can be worked, taking all this into consideration, together with the fact that the Atlantic and Pacific railroad now actually passes within twelve or fifteen miles of the mines, it will be readily seen that this district offers advantages to prospectors not excelled anywhere. We confidently expect that the day is not far distant when hundreds of men will be found at work on the American Flag and Dean mines alone, and that each of these mines will support a twenty stamp mill of its own, as every one familiar with them will acknowledge they are abundantly able to do. To prospectors and strangers from afar in search of good mines and something that will pay to stay with and develop, we say take a look at Maynard district.

Pure, weak and sickly children need Brown's Iron Bitters. It will strengthen and invigorate them.

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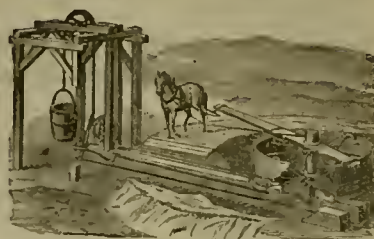
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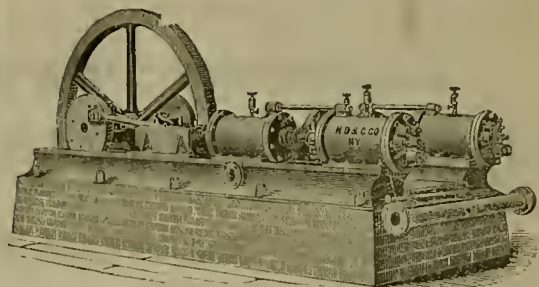


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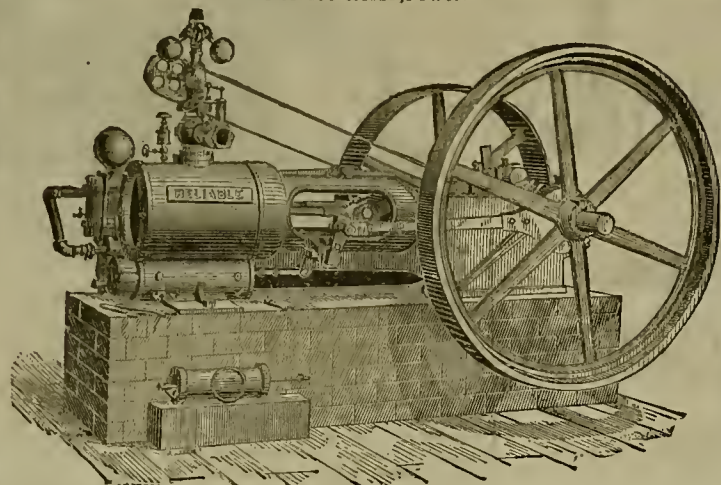
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One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The whim is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of the whim is bolted to bed-timbers, thus avoiding all from work. When required these whims are made in sections to pack on mules.

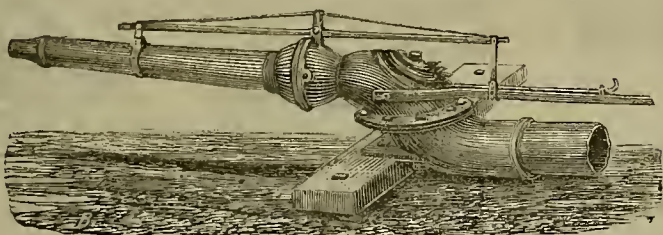
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The powder is put up in cartridges of any size to suit the consumer and is exploded in the same manner as all other high explosives; that is, by means of cap and fuse, or by electricity. It is not claimed for this powder that it is a non-explosive, or safer than other nitro-glycerine powder. All powder, and especially nitro-glycerine powder, should be handled carefully. The EXCELSIOR POWDER is as safe, and for strength far surpasses any other powder on the market. Address all orders to

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Cash in Advance.

Our terms are cash in advance for this paper. NEW NAMES will not be entered on our printed list until payment is made. Feb. 1, 1884.

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Should this paper be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent.

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Orders for Mining and Scientific Books in general will be supplied through this office at published rates.

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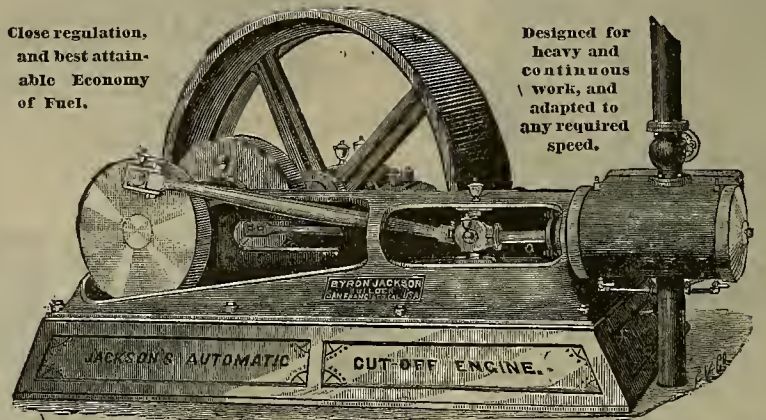
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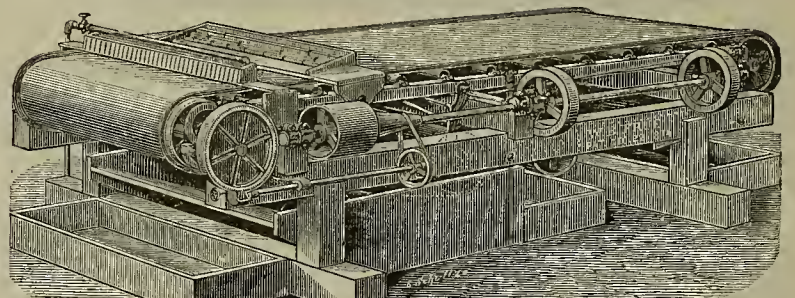
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To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringement responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

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Nov. 6 1882

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Should consult DEWEY & CO., AMERICAN AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as journalists and large practice as patent attorneys enables them to offer Pacific Coast inventors far better service than they can obtain elsewhere. Send for free circulars of information. Office of the MINING and SCIENTIFIC PRESS and PACIFIC RURAL PRESS, No. 252 Market St. q. c. Elevator 10th Floor 64.

NOTICE OF REMOVAL.

The Clayton Steam Pump and Air Compressor Works would respectfully announce that they will remove May 1st, to their new works, 45 and 47 York St., Brooklyn, N. Y. (near the approach to the New York and Brooklyn Bridge.)

Notes from Eureka, Nevada.

(CONTINUED FROM PAGE 288.)

chamber through broken ground, which may lead to large ore bodies above that level. In the same chamber, on the June level, are four men taking out ore on tribute.

The November drift is being continued by miners on contract. There are good-looking places in this drift, which if crosscut, may lead to ore. A drift is being run on the main fissure, westward from the Uncle Sam shaft which, it is believed, will lead to ore. This fissure is the same one on which all the large ore bodies in the Richmond mine made, and there is no reason why another body of ore should not be found in this direction. The No. 5, fine dust chamber, is being turned to good account; a track has been laid in it, and it is to be driven further into the hill easterly, for the purpose of prospecting the Allion ground above this level. This is a very good move, and it may result in the discovery of very good bodies of ore. The ore bodies on this level in the Richmond and Eureka Con. mines have helped to swell the dividends for those companies, and may do the same for the Allion company, notwithstanding the present indebtedness hanging over it.

There are several thousand bushels of charcoal, a large supply of wood, and nearly everything on hand needed to run the mine for several months. The current expenses of running the mine must now be very light.

There are quite a number of miners leasing property on Adams Hill, and a very considerable amount of ore is being sent to the furnaces from that locality; so much in fact as to deserve marked attention.

One of the best properties on Adams Hill is the

Oriental and Belmont Mine.

Sums of money aggregating between \$200,000 and \$300,000 have been realized from the ore taken out of the almost numberless holes that have been sunk in the ground. While visiting this mine, a few days ago, my attention was called to one of them where the rock had been quarried out, and from it a sum of money was realized amounting to \$8,000. The ore was gray carbonate carrying \$78 in silver and \$22 in gold per ton. A similar amount of money was realized from ore taken out of a hole to the northward of the first that is not more than fifteen feet deep. Westward from there are several holes, and a shaft, down 150 feet from the bottom of one of them. The latter has been sunk to follow a seam, but it dips away from the ledge. This is the deepest shaft on the property. From the holes in this locality have been taken various quantities of ore, aggregating in value no less than \$20,000.

Near the south end of the survey for the Oriental and Belmont is the initial point of the original Belmont location, marked by an opening in the ground, sunk on an incline of about 20°, to a depth of about forty feet. Out of this Messrs. Bucl and Bateman, in the early days of Eureka district, took out to the value of about \$30,000, which, with some from the Racine mine, lying northward from it, toward the Richmond mine, was the first lot smelted by those gentlemen in the new furnaces they built for the reduction of ores from the Champion and Buckeye mines. Large quantities of ore were taken out of a vertical shaft adjoining, all of it being very rich in lead. The Oriental claims lie to the northeast of the Belmont; the main shaft is down only 38 ft from the surface, and has yielded considerable ore valued at \$60 per ton in gold and silver; it also carried twenty per cent of lead, had a fine quartz gangue and sufficient iron to make it valuable for the fluxes it contained.

The next point of interest, I said, was the old Midas shaft, which has been sunk to a depth of seventy-five feet, and from it a drift has been driven twenty-five feet through a ledge of low grade ore, some of which, however, was worked to a good profit. About twenty feet north from the Midas shaft, there has lately been scratching done on the surface, and quartz broken for flux. Here was also found ore that worked up to \$160 per ton. Near this point are some of the old Midas workings, a series of pot-holes burrowed close to the surface, out of which tributaries took ore enough to realize the net amount of \$20,000 after the ground had been abandoned by the owners as worked out. The Fairview shaft was situated close to this place. It was formerly owned by the Buttercup Co., and was sunk under the superintendency of Col. G. Collier Robbins, who, it is said, cleaned up \$40,000. Around and about this spot the ground has the appearance of California placer diggings that have been worked down to bedrock and deserted. Here, however, the ground is not worked out. There is still ore in sight.

Among the old locations now embraced in the Oriental and Belmont survey were the Newport, Black Ledges, Blue Wing, Meredith, New York and Louisville, which were owned by parties who strove to develop them, but there were so many conflicting titles to the ground at that time that it took all the money they could raise to buy one and another out. In 1871 George Hearst bonded the Meredith for \$20,000, but finding that other and different parties owned the Blue Wing, and that there was a conflict of title, he abandoned it and gave up the bond.

At various times there were several persons who claimed different portions of the ground and took out ore; others there were who chloided without leave, under the plea that they must make a living, and were permitted to do

so, the owners hoping to get rid of them finally, and in the meantime quiet conflicting titles. This was finally done by consolidation and obtaining a United States patent. The Louisville workings, now mainly filled up, have yielded ore from which selected shipments ran as high as \$300 per ton. A portion of this was successfully worked at the Lemon mill. The masses of quartz on this property are enormous; the bulk of it is low grade, running from fifteen to twenty dollars per ton. This it is thought can be worked by milling process, and in such quantities that large profits may arise therefrom.

As to the high grade ore, there is no question about their profitable treatment, they are just what are wanted at the furnaces for their fluxing qualities. There is not a property in the camp so easy of access as this, and had it not been for the succession of difficulties experienced by the owners, the money realized from the sale of ore taken out of the ground at divers times, would have been ample to develop it, and place it upon a dividend paying basis.

In the Pinto District

There is very little doing that is new. The Resene mine is to be started immediately. The tunnel of the Berryman Tunnel and Mining Company is in thirty-three feet in mineralized quartzite. Large quantities of quartz running heavy with lead, are being extracted from the Diagonal mines. The miners of the district will hold a meeting to-morrow for the election of a new mining Recorder, and amending the rules of the district.

J. N. H. JOSEPH.

Tombstone Notes.

[From Our Traveling Correspondent.]

EDITORS PRESS:—The Blue Jacket mine, about two miles westward, report a large body of high-grade free milling ore lately struck. The Gilded Age, right in the city, is being worked by C. J. Barber, who is now rejoicing in a streak of fine free-milling ore of high grade. His is a very cheap and practical hoisting works. The coiling drum with safe ratchet and brake band is driven by a W. I. Tustin, S. F., horse power, to which a span of small mules are attached, and, when necessary, another span can be added. Mr. Barber speaks in highest terms of this horse power. Over the shaft is a tripod for an elevated shieve, under which the bucket passes down the shaft, and the other end of the rope passes to the drum, which is located near the shaft and governed by a brake bar.

Mr. Barker professes to believe somewhat in the divining rod for discovering the exact location of gold, silver or copper, and which of them—and just how far off they are located—and claims in this lead to have been specially instructed by it, and by his work here that he has demonstrated just what the instrument did indicate would be found.

The local papers do not fully commit themselves on the rod question, but they do persistently rejoice when by any means any one is induced to dig where the pay ore is to be found, and do actually find it, and in finding it furnish good honest labor for the willing working miner.

Tombstone is favored with two daily papers, the *Republican*, revived from the ashes of the *Nugget*, and the sober, solid *Tombstone* inscription called the *Epitaph*. This journal sometimes forgets the solemnity of its surname and perpetuates huge jokes with its *Republican* neighbor. Each office makes us a very readable daily and weekly issue for country circulation.

Foundry and Machine Works.

McAlister & McCone of Virginia, Nev., have established a large foundry with iron lathes, planers and various heavy machines to build and repair mills and mining machinery. Mr. McAlister takes charge of this branch of their business. Their pattern rooms show somewhat the proportions of their operations in heavy machinery castings.

Tombstone Blue Stone and Acid Works.

Mr. C. J. Duval, assayer and mining engineer, has quite extensive acid and blue stone manufacturing works and is prepared for and filling orders from various parts of the Territory, thus saving long delay and high expense of railroad transportation from San Francisco.

This is considered a valuable and essential enterprise for the mining interest of the Territory. An order for six barrels of blue stone came in from the Total Wreck mill the other day. He manufactures the sulphuric acid to sell by the carboy and also for use in manufacturing the sulphate of copper—blue stone—from the rich copper ores produced here. I have not space to describe the many interesting processes of this busy establishment.

B. W. C.

Complimentary Sample Copies of this paper are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage; and as far as practicable aid in circulating the journal and making its value more widely known to others and extending its influence in the cause it faithfully serves.

Subscription rate, \$4 a year.
N. B.—Personal attention will be called to this (as well as other notices, at times) by turning down a leaf.

Copper.

Its Uses, Product, Value and Method of Working.

Copper was one of the first metals known to man. In an age so remote as that in which Adam and his immediate descendants were the only human inhabitants of earth, mines of copper were worked and their products fashioned into tools and utensils, but were far more extensively used for the manufacture of ornaments for the persons and the homes of the early inhabitants of our world.

Tubal Cain in the seventh generation from Adam—was an adept artificer in copper and brass. Chops worked successfully a copper mine on the Peninsula of Sinai. The ancient Egyptians, who possessed the art of hardening copper—combining with it an alloy of tin—made their tools of this metal, and employed them in the working of stone, and other metals. The first coins used by man were made of pure copper. It was consumed in large quantities by the Syrians, Phoenicians, Greeks and Romans in the construction of monuments and statues.

That the ore was

Worked Extensively by the Ancients,

Is evident from the various implements, utensils, ornaments, etc., which have been discovered beneath the ruins of buried cities in Egypt, in the tumuli in Denmark, in the quarries of the Aztecs at Mitla, Mexico, and in the copper mines of the United States, some of which were unquestionably worked by a race of people who preceded the Indian in the occupancy of North America.

Some idea may be gathered as to the extent to which the industry was prosecuted, and the facilities enjoyed for working and fashioning the products of the earlier copper mines of the world, from the following extract: "The Colossus of Rhodes, after having lain in fragments for centuries, is said to have required 900 camels to convey its pieces away."

In the middle ages, however, the production and use of copper would seem to have been in great measure abandoned, probably because of the discovery of the more precious metals with which it was found associated. At least the records of that period in the world's history contain little concerning the working or use of the metal.

In the Tenth Century

A copper mine was worked near Goslar, in Lower Saxony. In the twelfth century the Fahlun mine, in Sweden, was worked, and in the thirteenth century, the mines of Thuringia were extensively developed. From that time until the latter part of the eighteenth century, the copper mines of England yielded this metal more extensively than those of all the rest of Europe combined. So late as 1854, a noted writer said: "Great Britain exceeds all other countries in the number of copper mines and the value of their products."

In the year 1844,

The Lake Superior Copper Mines

Were discovered, and these have since proved to be the richest and most productive mines of this metal in the world. Abundant evidences of the previous working of these mines were found in the rude stone tools and the primitive appliances for reducing the ore which had been left by an unknown people, who had, in ages past, inhabited this continent, and whose history is unwritten.

These pre-historic workings were sometimes twenty feet in depth. Upon the rubbish that had partly filled the pits large trees had grown. A hemlock growing above one of these excavations was found to have over 350 annual rings of growth. Masses of copper over six tons in weight were found, that had been worked free from the vein, and cleared by fire from the vein-stone that had filled their interstices. Ashes and charred wood were found about them; evidence that an effort had been made to reduce their weight to a proper volume for transportation and further reduction.

In one of these mines a mass of virgin copper, forty-five feet in length by over eight feet in thickness, was found, the estimated weight of which was five hundred tons—yielding ninety per cent of pure metal. This was found in the Minnesota mine, in the Ontonagon district, Michigan.

Since the discovery of the Lake Superior deposits, the copper mines of the United States have, until recently, yielded a sufficient supply to meet the demands for home consumption, leaving, also, a large surplus for export.

The Total Yield of Copper

Of all known mines in the world, from 1830 to 1853, is given, approximately, as follows: In 1830, 25,500 tons, of which the mines of the United States gave 50 tons; in 1840, 41,000 tons—U. S., 100 tons; in 1850, 54,700 tons—U. S., 650 tons; in 1853, 55,700 tons—U. S., 2,000 tons.

From these figures it will be seen that there was a rapid advancement in the production of our copper mines up to the last date above mentioned. Ten years later, the aggregate yield of these mines in America was equal to that of all the other copper mines of the world.

The Usefulness of Copper.

Next to iron, copper is the most useful metal. In its general distribution, it comes next to that most important of all metals. The qualities of durability, malleability, ductility, etc., it possesses, render it well adapted for a great variety of purposes. Its disposition, moreover, to form alloys with other metals—for which it is particularly remarkable—causes it to be largely

used for the production of numerous compounds; and thus it is made to perform the service of a great number of different metals possessing a variety of qualities.

In this connection we should not omit to mention the fact that the immense consumption of copper for electrical purposes,—which with a single company in the east (Edison's) reaches twenty tons per diem—will afford a vast stimulus to this industry during the current year. No fear need be entertained that the steadily increasing supply from mines on the Pacific coast will cause the supply to be in excess of the demand for home consumption.

Yield and Value in 1882.

The entire product of all the mines of this metal, during the year ending December 31, 1882, at a moderate estimate, was not less than 100,000 tons of ingot copper, in the United States alone. Estimating this at eighteen cents per pound, we have a total value of \$36,000,000 for the year.

During the month of February last, seven Michigan mines produced 2,124½ tons of ingot copper,—124½ tons more than the total yield of all mines in America during the year 1853.

The Price of Copper

Fluctuates according to the demand and supply. At the beginning of the present century, owing to exhaustion of mines in England, resulting in great scarcity of the metal, the price advanced to £128 (\$640) per ton.

During the past few years market rates have varied from 15 to 20 cents per pound. New York quotations show rates in February last at 16½¢@16½¢ for Baltimore, 16½¢ for Arizona, and 17½¢@17½¢ per pound for Lake.

The various uses to which copper is now applied are so enlarged that the price is likely to be steadily maintained, notwithstanding the rapidly increasing production. It is the prevailing opinion among those best informed on the subject, that no material reduction in prices may be looked for for several years to come.

Profits of Copper Mining.

Probably no field of mining venture affords such inducements for investments as copper mining. The Calumet & Hecla mine, it is well known, has paid some \$22,000,000 in dividends to its shareholders, while most of the other Michigan companies have paid from thirty to fifty per cent per annum on their investment. During the past two years most of the copper mines operated in Arizona and New Mexico, notably the Copper Queen, Old Globe, Loug-fellow, Detroit, Omega, etc., have made large returns to the owners. It is evident that the business is sufficiently safe and profitable to offer great encouragement as to the future of this industry in our own country.

The Reduction of Copper Ores.

In the reduction of copper ores various systems have from time to time been adopted, the method being subjected in part to the character of ore worked and general existing conditions. For many years the business of smelting copper ores was carried on almost exclusively at Swansea, South Wales, near the mines of Cornwall and Devon, ores being shipped to that point from all parts of the world. Until the past decade, but little was known of the great resources of the Pacific States and Territories in copper. Some developments had been made in various parts of the country of a most promising nature, and much money spent in reduction works, based upon former methods of working, but the attempt to introduce the systems and practice of the Old World into the new, in this, as in many other things, was attended with disastrous failure. The new conditions were not suited to the old order of things. In this emergency Messrs. Rankin, Brayton & Co., of the Pacific Iron Works, in this city, a firm representing the most advanced ideas of modern practice in everything relating to the mechanical appliances for treating ores, conceived the idea of applying the principle of the water jacket furnace to the reduction of ores, and instituted a series of experiments, with a view of determining what form of jacket was best adapted to the purpose, as well as the mechanical construction necessary to withstand the severe ordeal that such work would be subjected to. After some years of persistent and costly experiments, a result was reached which has made

A Revolution in the Method of Copper Reduction

And which has created an industry that has been a source of vast increase in the wealth of the country.

It is no exaggeration to say that the extraordinary development of the copper interest in all our mining States and Territories owes its origin and present progress to the invention and general introduction of the Pacific Copper Smelter. This furnace has revolutionized all former methods, and made practicable the treatment of all classes of copper ores by a single process—so simple in operation and so economical in results that there is scarcely a copper mine anywhere, located favorably as to fuel and transportation, that cannot now be profitably worked.

Every successful copper enterprise in the country, without an exception, we believe, is being operated by this system of reduction. The manufacturers are now receiving orders for their smelters from nearly every mining country in the world, and the system seems likely to soon become universal. The same system of reduction, it may also be said, has been applied, with equal success, to all grades and classes of galena ores.

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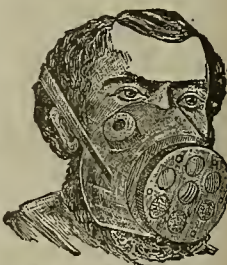
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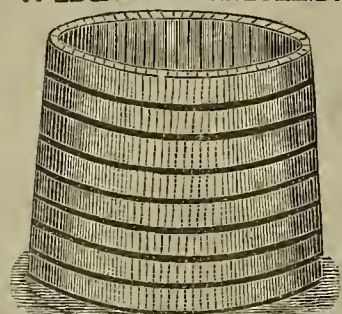
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Benson is on the S. P. and Atchison and Topeka railroad, 1,024 miles from San Francisco—elevated 3,578 feet above sea level with a population of 500. It has a thriving American look. It is the junction for the S. P. and Sonora railroad, now running to Guaymas, and the depot for Total Wreck and other mines.

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The plan of the company is to add more furnaces as the business will warrant. They were getting ores from Mexico and from their own mines in Lake valley, near Phoenix. Most of their silver ores they were getting from Tombstone mines. Were working Harshaw ore at the time I visited them. They use English and American coke mostly for fuel. They are getting ores of different classes, and purchasing them all, enabling them to use one kind to flux another.

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They use lime, and large amounts of old sheet iron, old tins, etc., to mix in with the ore as flux—pay there twenty dollars per ton for old scraps and tins. This company will be of great service to the many prospectors.

This is an encouraging feature for Arizona's prospectors. There are now numerous mills and smelters that will give them a fair valuation for their ores, and thus enable them to go on and open up their own ledges by their ore yield.

Benson was a very lively place till the Mexican railroad and depot buildings were completed, but now has not so large a hotel patronage. As the pay ore discoveries increase in the neighboring hills, will Benson grow and prosper. It is the prospector that invites the distant capitalist to come and invest. I often think the prospector is underrated in his self-sacrificing and risky adventures.

I met in Benson, Mr. Durfee, an early pioneer of Reese river and Nye county. One of the best of our lone prospectors—Mr. Durfee—sold a mine in Cornucopia, Nevada, about seven years since for \$12,000, then made a visit to his friends east and there took the Black Hills mining fever, and visited those diggings, but was not satisfied with the place; and, coming in contact with one who had been in the African gold mines, Mr. Durfee caught the African gold fever and started for that country, but first toured a while in Europe, then sailed from England for Africa, but found the mines very largely monopolized by English and Australian capitalists and very little encouragement

for a poor man. So he directed his course back, to rejoice over his rights as an American citizen, and to live in a better mining country than he found in all his travels. He now has some locations made in this vicinity that may yet prove equal to Total Wreck.

I daily see those who have their good sample ores of ledges yet to be developed by those who have cash, but not the courage and muscle to pack their camping requirements and spend years in search of this paying mineral. There is a disposition to speak too lightly of the small prospect shaft sunk by the discoverer of the lead. He may be, has sunk forty-nine holes and paid cash for many assays, before he found this one that he invites capital to invest in, for a small fraction of its supposed value. He is the one who braves the dangers of the murderous bands of roving Indians. Almost daily do our local papers here announce the slaughter of prospectors by Indians. W. B. CROWELL.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

PULLEY BLOCK.—Byron Jackson, of S. F., and Geo. W. T. Carter, of Byron, Contra Costa Co., Cal. No. 275,916. Dated April 24, 1883. The improvement in pulley blocks consists of a skeleton two-part iron shell, which is bolted together at the top and bottom, and has chambers formed in each side, into which wooden boxes are fitted. The pulley pin is formed with or fixed into the pulley, so as to turn in the wooden boxes. The top of the shell or case has a vertical hole opening at the bottom into an enlarged chamber, and the head of the bolt or hook by which the block is suspended fits loosely in this chamber, the shank passing out loosely through the hole.

TIRE-SETTER.—Francis Wime, Orland, Cal. No. 275,967. Dated April 17, 1883. The invention relates to an apparatus for removing tires from vehicle wheels and replacing them in their proper position; and it consists of a frame which may be secured to a bench or table or otherwise supported, and which carries an adjustable spindle and sleeve upon which the wheel is supported, so that its rims may be brought beneath a presser foot wheel and forced down by a lever or other power. The edge of the tire rests on a support so that the wheel felly may be forced out by the pressure. The device is specially useful in removing and replacing the tires of header wagon wheels and other heavy wheels. These tires are usually secured by bolts or rivets, which pass through holes transversely beneath the tire and have broad heads to prevent the tire coming off. These tires are usually knocked off and the felly often broken. By this apparatus the tires are forced off and on by gradual pressure, without hurting the wood work.

BEAUTIFUL skin and fair complexion, robust health and powers of endurance, follow the use of Brown's Iron Bitters.

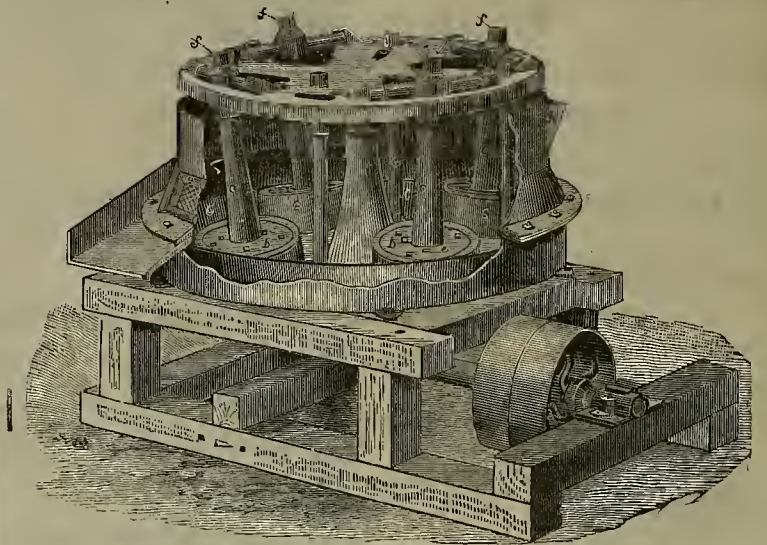
FRUIT PLANTING.—One thousand acres of land have been planted, and a large part of it put under cultivation, at the new colony of Redlands, near San Bernardino, the present season. Raisin grapes are taking the lead, the red soil of which the tract is composed being especially adapted to their culture.

THE Mexican Government denies the report that Americans cannot acquire land in that country.

Our Agents

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

G. W. McGRAW—Santa Clara county.
M. P. OWEN—Santa Cruz county.
J. W. A. WRIGHT—Merced, Tulare and Kern counties.
JAMES C. HOAG—California.
B. W. CROWELL—Arizona Territory.
N. H. HAPGOOD—Plumas county.
M. H. JOSEPH—Eureka, Nev.
GEORGE McDOWELL—Sonoma county.
F. W. STRATTON—Calaveras and El Dorado counties.
I. M. LEHRY—Los Angeles, San Bernardino and San Diego counties.
A. C. KNOX—Oregon and Washington Ter.

F. A. HUNTINGTON'S**Centrifugal Roller Quartz Mill.**

After running one of these mills on the Whidden mine, in El Dorado County, over four months, and thoroughly testing its capacity and durability, I am prepared to offer it to the mining public, and claim for it the following advantages over the drop stamp mill:

1. The cost of same capacity is not more than one-half that of Stamps.
2. Freight to mine one-fourth that of Stamps.
3. Cost of erection at mine one-tenth that of Stamps.
4. It runs with one-third the power per ton of ore crushers.
5. The wear is less than that of Stamps.
6. The wearing parts are easily duplicated.
7. It has a much better discharge and leaves the pulp in better condition for concentrating.
8. It is a better Amalgamator, saving fully nine tenths of the gold in the mill (the balance can be saved on plates in the usual manner).
9. It is continually crushing, not like the Stamp, using power to suspend it in air ninety nine one-hundredths of the time, and the balance making a thundering noise and accomplishing comparatively small results. It is as far in advance of the Stamp Mill as the present method of making flour with improved rolls is over the Indian's mode of crushing corn in a stone mortar.

MILLS ERECTED WITH ALL APPLIANCES COMPLETE.

Capacity and Durability Guaranteed.

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

TUSTIN'S PULVERIZER

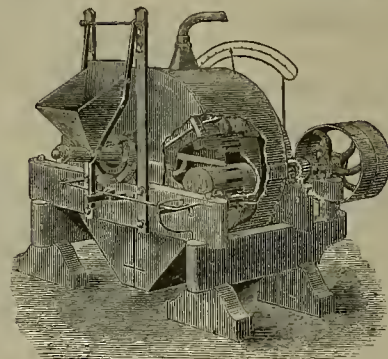
WORKS

ORE

WET

OR

DRY

BY
METHOD

W. I.

TUSTIN,

Inventor

—AND—

Patentee.

MANUFACTURED AT

The Tustin Windmill Horse-Power and Pumping Machine Works,
308 MISSION ST., SAN FRANCISCO, CAL.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

CORRESPONDENCE is cordially solicited from reliable sources upon all topics of interest and value to our readers.

Promptness and Energy.

RISER, March 10, 1883.

Messrs. DEWEY & Co.—Dear Sirs: I have received my patent for "Portable Assay Furnace," and will say that I am pleased with your promptness and energy. I can cheerfully recommend all my friends to you, knowing that you will give them entire satisfaction. Yours truly,
J. C. TAPPEINER.

THE JOHN A. ROEBLING'S SONS CO.,

Manufacturers of

WIRE ROPE and WIRE

Of Every Description.

For Inclined Planes, Standing Ship Rigging, Suspension Bridges, Ferries; for Mines and all kinds of Heavy Hoisting; for Stays and Guys on Derricks, Cranes and Shores; for Tilters, Sawmills, Sash Cords, Lightning Conductors, etc. Galvanized and Plain Telegraph Wire.

Agents for **NEW JERSEY WIRE CLOTH CO.,**

14 Drumm Street, - - - SAN FRANCISCO, CAL.

THE BUCK THORN BARBED FENCE (One Piece Solid Steel.)

SEND FOR CIRCULAR.

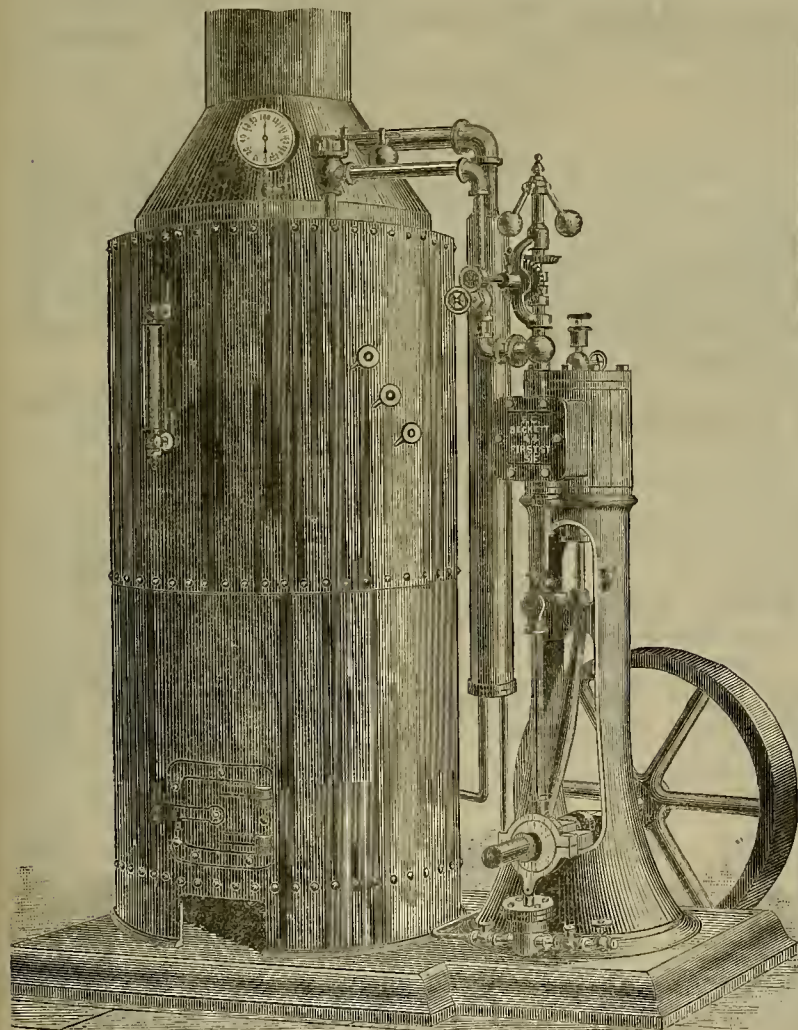
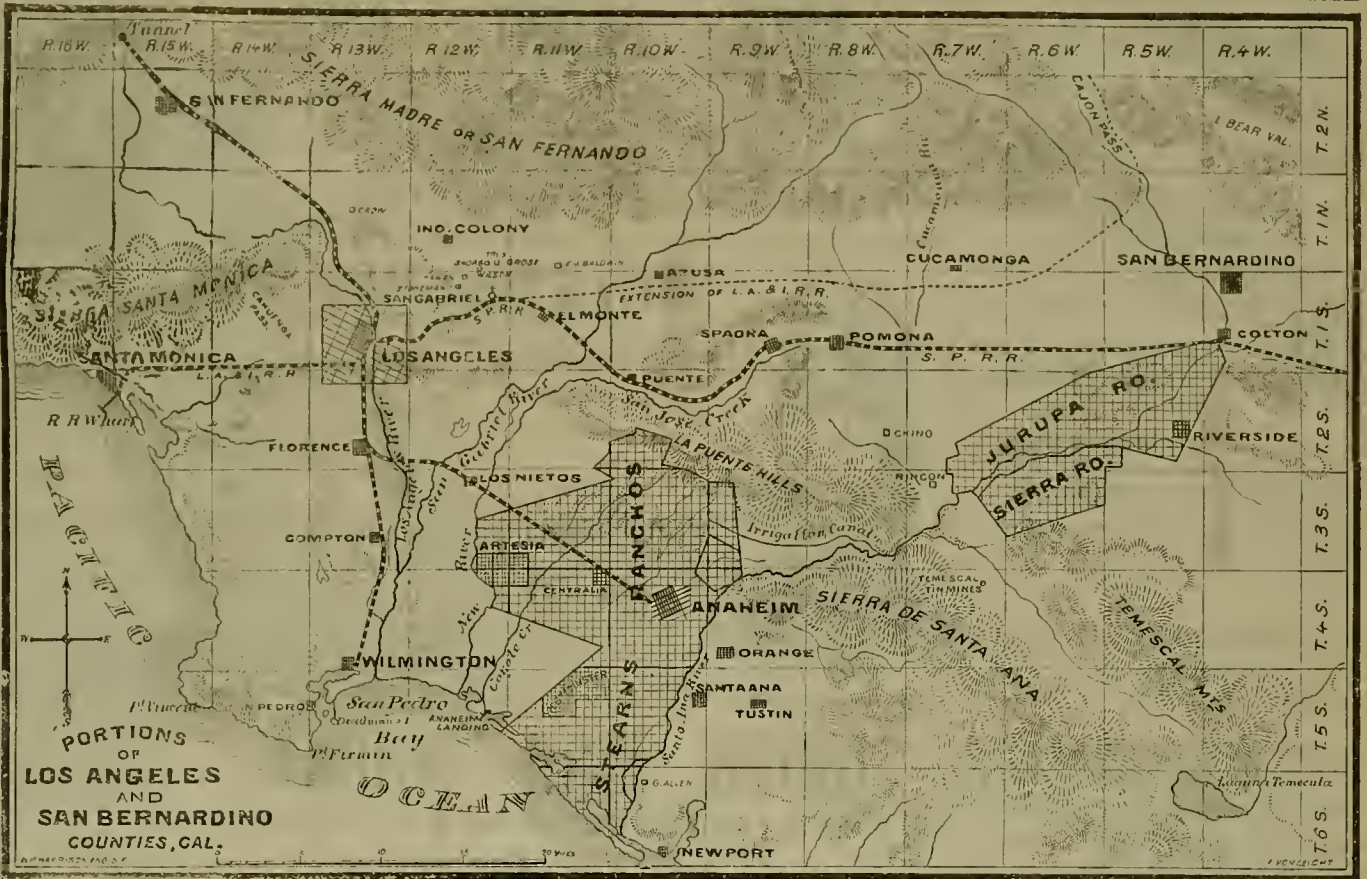
"Abel Stearns RANCHOS."

The Center of Los Angeles Valley.

Embracing Anaheim, Westminster, Artesia, Garden City, etc. Thirteen miles southeast of Los Angeles City, within the Artesian Well Belt. Hundreds of flowing pipe wells. Water near the surface. Rivers on two sides; ever-flowing creek runs through the tract. Front on the Ocean. Transportation and passage by Steamships or Railroad, Southern Pacific Railroad through the tract. Twenty-one hours from San Francisco. The unsold land for sale or lease in sections or fractions. Apply to Trustee A. ROBINSON, 318 California St., San Francisco.

Or to ROBERT J. NORTHAM, Anaheim, Cal., or concerning Westminster Colony, to REV. ROBERT STRONG, Westminster, Cal.

Terms, one-fifth cash, balance on interest at 10 per cent. per annum. Send for Circulars and Maps.



F. G. BECKETT,

Manufacturer of

VERTICAL AND HORIZONTAL ENGINES AND BOILERS,

FROM 2 TO 90-HORSE POWER.

Improved Hoisting Engines, Engines for steam Yachts, Engines for pumping artesian wells and irrigating and farming purposes, and all kinds of Machinery.

Repairing Promptly Attended to.

No. 44 FIRST STREET, SAN FRANCISCO, CAL.

DODGE'S Wet & Dry Concentrating Machinery

FOR CONCENTRATING

GOLD, SILVER, LEAD AND COPPER ORES.

CONTINUOUS OR CHARGE

FURNACES

For Roasting and Chloridizing Ores, for Amalgamation and Leaching.

THE NEW IMPROVED

DODGE ROCK BREAKER!

HE CHALLENGES THE WORLD

To produce as Good and Cheap a MACHINE.

PULVERIZERS, TO GRANULATE ORES,

For Roasting, Chloridizing, Leaching and Concentrating.

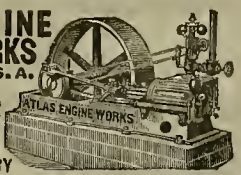
M. B. DODGE,

143 Fremont Street, : : : : San Francisco, Cal.

Send for Catalogue and Prices.



ATLAS ENGINE WORKS
INDIANAPOLIS, IND., U.S.A.
MANUFACTURERS OF
STEAM ENGINES AND BOILERS.



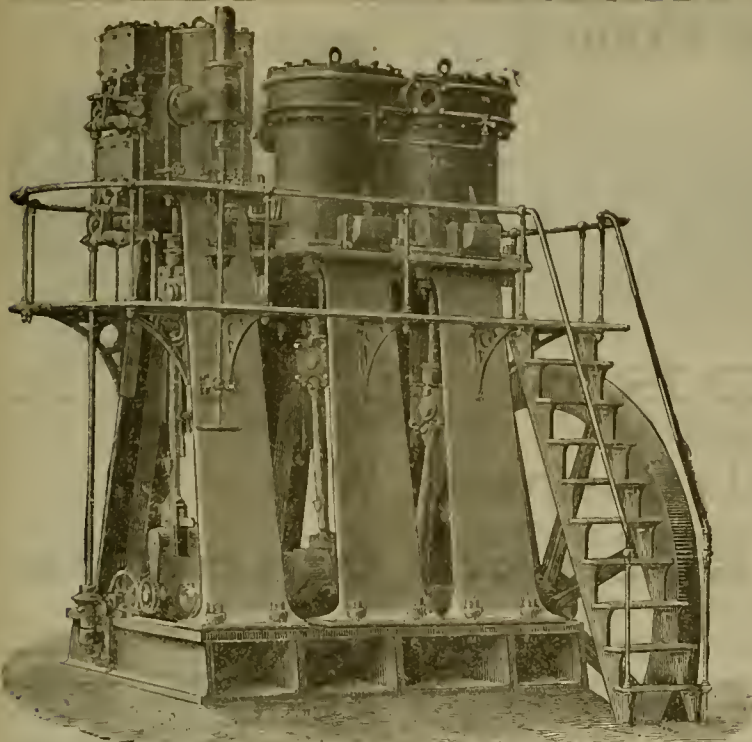
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How to Stop this Paper.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

Conclave, S. F., 1883. Every Knight Templar should subscribe for the FRATERNAL RECORD, a large, handsomely illustrated 16-page fraternal newspaper, published on the 8th and 23d of each month in San Francisco. It contains the fullest and earliest news of the coming Knight Templars' Grand Triennial Conclave, an immense gathering to be held at San Francisco, and grand excursion across the continent. Subscription price \$1 for six months, \$2 per year, with three months back numbers to Eastern subscribers. Address FRATERNAL PUBLISHING CO., San Francisco, Cal.

Dewey & Co. { 252 Market St. } Patent Agt's



With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

Mining Machinery Depot,

PARKE & LACY,

21 and 23 Fremont Street. S. F.

NO. 7 IMPROVED

AIR COMPRESSOR.

SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

PACIFIC MACHINERY DEPOT.

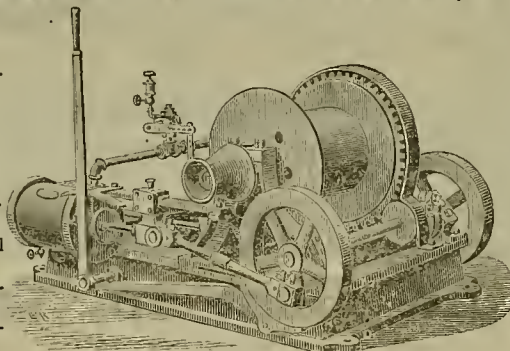
H. P. GREGORY & CO.,

Importers and Dealers in Machinery and Supplies.

Nos. 2 and 4 California Street, S. F.

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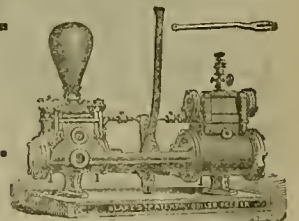
J. A. Fay & Co., Wood Working Machinery.
Bement & Son's Machinists Tools.
Blake's Steam Pumps.
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Hoisting Engines of all Kinds.

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Sturtevant's Blowers and Exhausts.
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Korting's Injectors and Ejectors.
Disston's Circular Saws.
Frank & Co.'s Wood Working Machinery.
New York Belting & Packing Co.'s Rubber Belting, Hoses, Packing, etc.
Ballard's Oak Tanned Leather Belting.



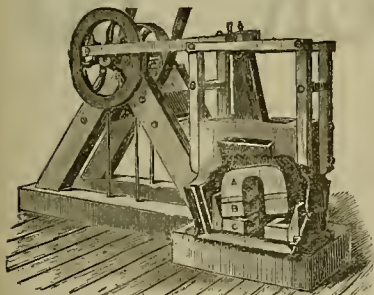
BLAKE STEAM PUMP.
More Than 16,000 in Use.



MILL AND MINING MACHINERY.

F. A. HUNTINGTON,

No. 45 Fremont Street. - - San Francisco, Cal.

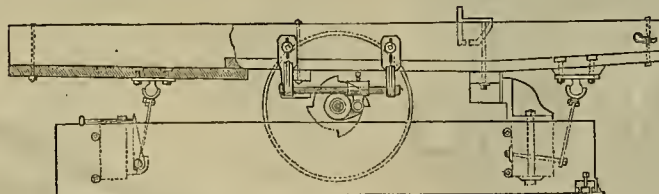


Oscillating Stamp Mill.

It has no Stems, Cams, or Tappets, and adjusts itself to the wear of the Shoes and Dies.
For simplicity, economy, durability and effective working, it exceeds anything ever presented to the public, and will do the work of five stamps with one-fourth the power. Awarded First Premium and Medal at Mechanics' Fair, S. F., 1880.

Manufactured by
F. A. HUNTINGTON, FRASER & CHALMERS,
45 Fremont St., S. F., Cal. 115 Fulton St., Chicago, Ill.
Improved Patent Grinding and Amalgamating Pans, Concentrators and Gold Amalgamators; also, Steam Engines and Mining Machinery of all kinds. Send for circulars.

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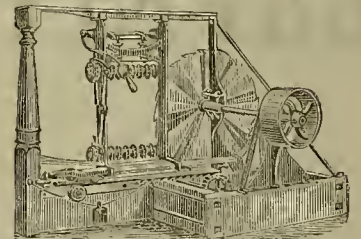


PATTEN'S CONCENTRATOR.

This machine requires less power, less care or attention, and is less liable to get out of repair than any concentrator now in use. All of which any practical miner will comprehend when seeing it in operation.

The wear and tear is nominal, and the construction so simple that any miner can put it up and run it; and the low price brings it within the reach of all mill men, as it will save enough to pay for itself in a very short time. One machine will concentrate the tailings from a five-stamp battery.

Send for Circulars.



SHINGLE MACHINE.

For simplicity, durability and rapidity of action, these Machines have no equal, cutting from 3,000 to 4,000 per hour. They are now used by all the principal Millmen on the Pacific Coast.

SAWMILL MACHINERY,

Of all descriptions made to order.

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Pacific Rolling Mill Co.,

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ROLLED BEAMS, ANGLE, CHANNEL AND T IRON, BRIDGE AND MACHINE BOLTS, LAG SCREWS, NUTS, WASHERS, ETC., STEAMBOAT SHAFTS, CRANKS, PISTONS, CONNECTING RODS, ETC., ETC.

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HIGHEST PRICE PAID FOR SCRAP IRON

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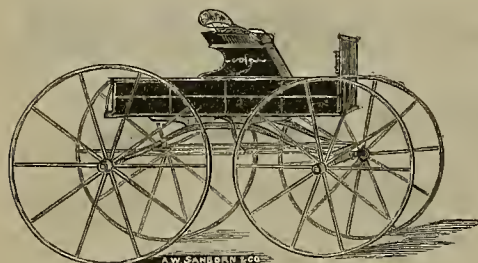
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HOME INDUSTRY! ALL WORK TESTED AND GUARANTEED!

Stationary and Compound Engines, Flour, Sugar, Quartz and Saw Mills. Amalgamating Machines.

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Sole Manufacturers of Kendall's Patent Quartz Mills.



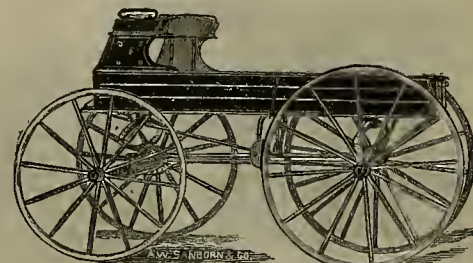
SIDE SPRING BUSINESS WAGON.

THE SANBORN WAGON

STANDS IN ANY CLIMATE,
REDUCES REPAIR BILLS,
GIVES MORE SERVICE FOR THE MONEY,
SAVES YOUR STOCK.

BECAUSE

IT IS THOROUGHLY SEASONED,
MADE OF THE BEST MATERIAL,
PUT TOGETHER BY SKILLED WORKMEN,
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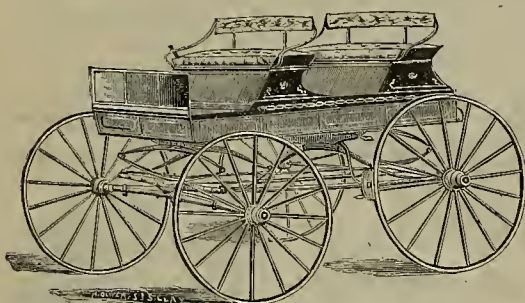
Express, Thorobrace and Business Wagons,

From their Own Manufactory in Manchester, N. H. Also Agents for the

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Nos. 24 and 26 Beale Street, San Francisco.

SEND FOR DESCRIPTION AND PRICES.



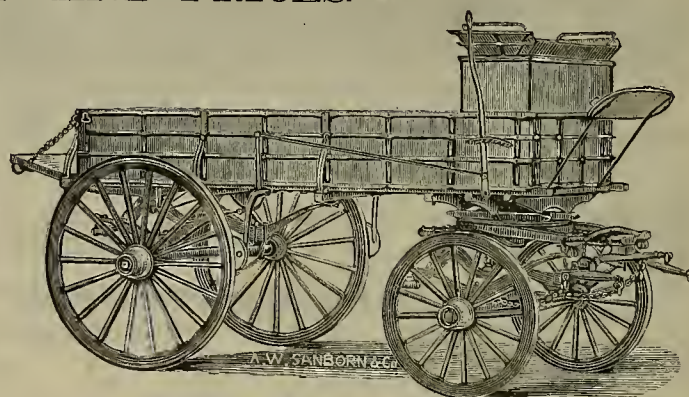
Four Spring Family, Livery and Delivery Wagon.

THE
BEST PROPORTIONED

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EVER SOLD ON

This Coast.



PLATFORM SPRING EXPRESS.

We Build only One Quality, THE BEST. Every Wagon Warranted.

Used by all the Leading Express, Transfer, Stage and Transportation Companies, and Merchants West of the Rocky Mountains.

Absolutely the Best in the Market!**SAFETY NITRO POWDER CO.**

430 California Street, San Francisco, Cal.

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—BEST OF—

HIGH EXPLOSIVES

Safety Nitro No. 1.

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The Sterling Merit of these Powders is to-day Unquestioned.

YOU WILL CONSULT YOUR INTERESTS BY USING THEM!

**BLACK****POWDER****STRONGEST IN THE MARKET!**

Furnished in Bulk or in Water-proof Cartridges, as desired.

Endorsed by prominent Engineers as the Most Economical Blasting Agent of the day

The Enormous Demand for this Powder has caused others to Imitate our Trade-Mark. Be Sure you Get the Genuine.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News-

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MAY 5, 1883.

VOLUME XLVI
Number 18.

Swedish Blast Furnace.

In some of the Swedish mines poor ores—four to five per cent of black copper—are worked and divided into two classes first. The smelting of the ores involves four operations, consisting of two calcinations or roastings, and two fusions, exclusive of the refining of the black copper produced in the blast furnaces in the two fusions. The ores are roasted or calcined in heaps or kilns, or any convenient way. The furnace is what interests us. The second stage consists in producing a regulus containing from twenty to thirty per cent of copper, obtained by treating the roasted ore with black copper slags, and occasionally, also, carbonate of lime in a blast furnace.

The furnace shown in the engraving is known as the ore furnace, which is provided with four, or, in more recently constructed furnaces, with three horizontal twyers, *a, a, a*, placed in the arch, *f*, of the back wall of the furnace. The shaft of the furnace is rectangular in section, the back wall being vertical, while the front wall, supported upon the tympanum, *b*, and an iron girder, rises vertically for a short distance, then inclines towards the back, and so narrows the section of the stack towards the top; the hearth projects beyond the line of the front wall, and the tap-hole is situated at one corner of the fore-hearth so formed. The hearth is lined with a mixture of clay and sand well rammed in, and beneath is a drain for the escape of moisture. These furnaces measure from twenty to twenty-four feet in height, and are about four feet in diameter at the level of the twyers.

Smelting in these furnaces is most frequently attended with the production of a ferri-ferrous mass or "bear," which collects in the bottom of the hearth; and resulting from the presence of incandescent carbon, together with the reducing atmosphere of carbonic oxide in the furnace, whereby a proportion of the oxide of iron, formed in the roasting of the iron pyrites contained in the ores, is reduced to the metallic state according to the reaction described under iron smelting; and these masses accumulate the more rapidly if the roasting be carried too far, and less slowly if a proportion of sulphur be left in the ore. Indications of the working of the furnace are afforded by the appearance of the furnace eye, at the end of the slag prolongation of the twyer, under which the furnace is always worked, for, if too much slag be added to the charge, the nose forms too rapidly, whilst the reverse is the case if an excess of fuel be added. The furnace being at work, the regulus and slag collect in the hearth, and at intervals about two thirds of the slag, which is essentially a ferrous silicate floating above the regulus, and will not contain more than .25 to .5 per cent of copper; is tapped out into sand beds and thrown away, while the remainder is returned to the ore furnace with succeeding charges. The furnace is only finally tapped when the hearth has become quite filled with regulus, which usually happens in from two to three days, when it will contain about five tons of metal, which is run out into sand beds, and when cold it is broken into pieces for roasting in the next (third) operation. The fuel employed is either coke or charcoal, latterly the former has come into more general use, and the practice of using hot instead of cold blast has been introduced.

RENTS were never so high at Chicago, the advance this season averaging over twenty per cent, and in some over fifty per cent.

Pacific Coast Mining Exposition.

We have before referred to the proposed Pacific Coast Mining Exposition to be held in this city during the month of August. Circulars have been sent to the Supervisors of each county in the State asking their co-operation in the matter of providing an exhibit from the respective counties. Other preparations are also being made.

The exhibits will be in two general classes, viz: donations to the State Museum, which

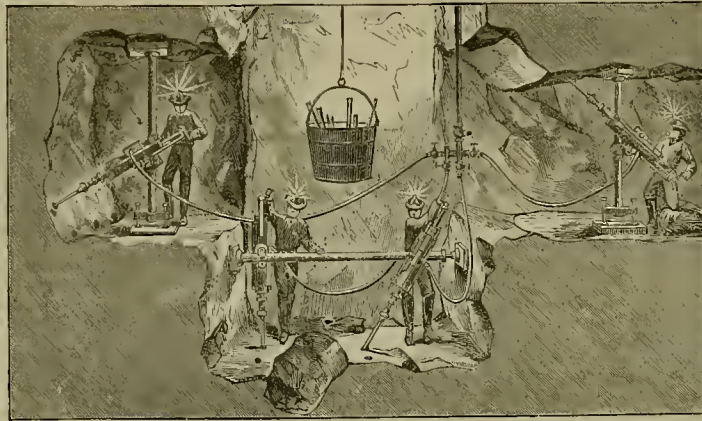
inches in diameter, excepting very rare or valuable minerals.

2. Wrap each specimen up carefully in paper; with a label inclosed, stating locality as exactly as possible—section, township, and range, and name of county—also the name of donor.

3. When two or more specimens are sent at the same time, observe Rule 2, and pack together tightly, so as to avoid any rubbing of the specimens.

4. When a number of specimens are sent in one box, in addition to the regular label (Rule 2,) have them numbered and a list with corresponding numbers made out and sent in the box.

5. Tack on the regular address card of the



SHAFT SINKING AND DRIFTING WITH MACHINE DRILLS.

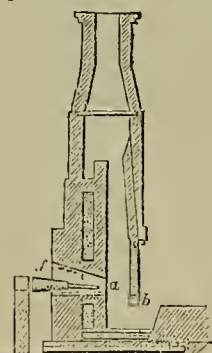
will remain on permanent exhibition after the close of the exposition; and loan exhibits which will be returned to the owners at the close of the exposition. In order to make the exposition worthy of the State, the committee ask citizens to forward directly to the State Mining Bureau, or through their own county committee, any specimens which may represent any of the

State Mining Bureau, or address "State Mining Bureau, 212 Sutter street, San Francisco."

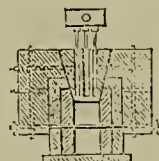
6. Use every precaution in sending fragile specimens; pack separately in a small box so that they do not damage from defective packing.

7. Before sending unusually bulky or weighty specimens, correspond with the Secretary of the committee concerning same.

8. Advise the State Mining Bureau of every



SWEDISH FURNACE FOR COPPER.



Plan of Swedish Furnace.



STARTING A TUNNEL.

resources of the State or are of interest otherwise.

It is desirable to exhibit specimens of ores occurring in the State, such as gold, silver, copper, lead, antimony, tin, nickel, quicksilver, iron, etc.; also clays suitable for brick, fire-clay, pottery, porcelain, etc. Useful and ornamental stones for building, paving and statuary, lime, plaster, etc.; cements, natural and artificial; mineral oils, crude and manufactured; soda and borax, crude or manufactured; nitrates, chromic iron, rocks and minerals of all kinds, salt, coal, fossils, woods, native and cultivated; fibrous plants, native and cultivated; paper material, native and cultivated; tanning material, native and cultivated; sands suitable for glass making, etc.; mineral soap, soapstone, Indian relics, and specimens of curious natural formations of any kind that may be interesting.

Specimens will be received from now on to August 1st. The committee have issued the following directions for exhibitors:

1. Specimens should be not less than two

shipment, stating when and how the shipment was made.

9. Send all small packages of twenty pounds or less, by Wells, Fargo & Co.'s Express and charges will be attended to at this office.

HON. JOSEPH WASSON, U. S. Consul at San Blas died there a short time since. Mr. Wasson was for many years a journalist and mining man in this State. It was entirely due to his efforts that the State Mining Bureau was founded.

FROM all accounts, El Dorado county is having a boom in quartz mining, as within the past year there have been a number of excellent developments, and many new mines have started up. The increase in the number of stamps is far greater than in any previous year. Grizzly Flat and Henry's Diggings are the scenes of the most active operations.

Machine Mining Drills.

The use of power drills is now absolutely necessary in all extensive mining operations, and, where a few years ago there was one of them in use there are now ten. In small mines people manage to get along the old fashioned way, but it is not from choice but rather from necessity. In operations of any magnitude, however, air compressors and machine drills are essential. The engravings shown on this page show, in a small space, the more common uses to which these drills are put.

The upper one of the engravings represents a shaft-sinking scene where the Ingersoll drills are arranged for vertical and angular boring in the shaft bottom, and drills, mounted on columns, are working in the drifts each way from the shaft. A bucket is being lowered with a new set of drills for the machines. The power to the drills is supplied from a common air pipe, and this power from the one compressor is sent to any part of the mine. The small engraving is intended to represent the starting of a tunnel into a mountain, where the men are getting ready to form a "face."

THE PROSPECT.—Under the above head the Walker Lake *Bulletin* editorially gives its birth-place the following send-off: Certainly no town in the State has a better outlook than has Hawthorne. The mines now developed in the immediate neighborhood give it a certainty of a large amount of business for years to come, while there are innumerable claims in all directions, which only need the expenditure of a little capital to make them wealth-producing properties. Not a day passes during which some new strike is not reported, and the season for active prospecting has scarcely begun. Of course all the discoveries now being made will not develop into paying mines; but where there are so many, no reasonable doubt can exist that some of them, possibly many, will rival in extent and value the pioneer in development, Mount Cory. Nearly all the rich districts are in a section of which Hawthorne is the natural base of supplies, and even now, while being simply prospected, they pay a fair tribute to the business men who have located here. In a few months the county buildings will be built, and all county business will be transacted here. This will also help materially the commercial aspect of the future, and will give a permanency which will prevent discouragement during the depressions incident to the ups and downs of mining excitements.

THE South Yuba River Tunnel Co., at Hoyt's crossing, have their tunnel in 700 feet, leaving about 300 feet to run, which will require from three to four months. Diamond drills are used in the work, which is being carried on now from both directions. This tunnel is fifteen feet wide, and nine feet high in the center. It extends the entire distance through hard granite. When finished it will enable the owners to work a long section of the river bed, which is believed to be very rich in gold, as the stream can be diverted from its natural channel into and through the tunnel.

THE Calaveras *Chronicle* says that there was a heavy execution sale made last Wednesday by Sheriff Thorn, of the property owned by the Calaveras Water and Mining Company and the New York and Calaveras County Mining Company. The property consisted of the hydraulic mines known as North and South Hill, near Jenny Lind, together with all the mining appliances, ditches and reservoirs. The property sold for \$25,000, and was bid in by Wm. P. Miller, who was the plaintiff in the action and who had recovered judgments amounting to \$40,000.

A YOUNG Cornishman named John Davis, recently found a "pocket" near Tuttle town, Tuolumne county, from which he has taken upwards of \$4000.

English Investments in the Pacific Coast Mines—No. 3.

[Prepared for the MINING AND SCIENTIFIC PRESS by H. DEGROOT.]

Other Unfortunate Utah Investments: The Flagstaff Venture and its Results.

Encouraged by the much good fortune that seemed in waiting for the Emma investors, the British public were led to embark their means in other of these far off, little known and ill-started Utah mines, the Flagstaff, also located in Little Cottonwood canyon, being the next property to pass into their hands, the sale having been effected in 1871. As in the case of the Emma purchase, the price paid for this mine was greatly in excess of its actual value, although a large body of rich ore had been developed in it prior to its transfer to the English company. The capital stock of this company was fixed at £300,000, all, as usual in that country, fully paid up.

When the new owners came into possession of the mine it was estimated to contain 30,000 tons of gray and yellow carbonate ores, three and a half tons of which made one ton of base bullion. During the year 1872, 10,500 tons of ore were extracted from the mine and reduced by the two smelters, producing 3,000 tons of bullion, the total value of \$750,000. The net earnings of the mine for the year amounted to over \$380,000, nearly all of which was disbursed to the shareholders in dividends. The metal turned out here during 1872 consisted of silver, \$390,000—average, \$130 per ton; gold, \$120,000—average, \$40 per ton, and lead, \$240,000—average, \$80 per ton, the ore treated carrying about forty-five per cent lead. The prosperous career so entered upon by this English company in 1872 was continued with but little variation until the summer of 1877, when, all of a sudden, came the discovery that the ore reserves in the mine were exhausted.

Such being the case, the smelters were shut down and, the local office being without funds, the entire labor force both at the mine and the reduction works was discharged. So careful had the directors of the company been to pay over the net earnings of the mine to the shareholders that when this crisis in their affairs occurred they were not only without funds, but were considerably in debt. Out of these debts and questions involving the title to a portion of the mine, grew law suits, which, dragging along for some time and entailing much expense, ended in the entire property being disposed of at sheriff's sale and passing into other hands.

Having, through this short sighted and improvident policy, suffered this really good mine to slip from their grasp, the directors, acting in concert with the shareholders, began to devise means for its recovery. A new company was formed, or rather, perhaps it should be said the old company was reorganized, and a syndicate formed, the members of which addressed themselves to the business in hand in such an active and determined way that the end proposed was finally effected, the company coming again into possession of the property in 1880.

Ample funds having been provided under the new arrangement, all claims against the estate were liquidated. The work of development was resumed and has since been carried on with results that promise soon to restore the Flagstaff to its former position in the front rank of Utah mines. Up till the time of its sale to the English company, the Flagstaff had made as good a record as any mine in the Territory. It was at that time in prime condition, with a good plant and a large body of high grade ore in sight, and, despite the excessive price paid for the property, had the finances of the concern been administered with ordinary skill and prudence, the investment would have proved remunerative and every way satisfactory. Finding themselves with a large stock of ore on hand at the start, the management attacked and used it up with all possible haste, neglecting meantime to search after new ore bodies and have them in readiness against a time of need. To this mistake chiefly, were the subsequent disasters that overtook the company due. The neglect to provide a reserve fund for repairing accidents to the mine or works or meeting other contingencies, as are inevitable in the life of every mine, was another blunder, such as no prudent and well-ordered company would have been guilty of.

"Next!"

Following the Flagstaff was the sale of the Sparrow Hawk group of mines, Camp Floyd district, purchased by another English company and, of course, at figures out of all proportion to the real value of the property. On the consummation of this sale in London, October, 1871, the purchasers proceeded to organize a company with a capital stock of £120,000—12,000 shares of the value of £10 each fully paid up. A first-class twenty stamp mill was in good time erected on the ground and the work of ore reduction commenced. After flourishing for a short time troubles began to develop themselves. The ore, at first free milling, became base and intractable to a degree that precluded its being successfully treated without roasting; it also deteriorated somewhat in value as depth was attained; the upshot of these troubles being a closing down of both the mines and the mill, which latter had been built at a very heavy cost. This company, on suspending

operations, was not, however, indebted to any one, nor was the property involved in litigation.

They were even fortunate enough in one year to dispose of their mill for about one third of its cost, the company having, in this particular, experienced something of the good luck that attended the Farmington Canal Co., of Connecticut, who every summer mowed the tow-path and sold the hay. For their mines, however, these trusting Englishmen never received a dollar, these having been at first closed down and afterwards practically abandoned. This company never paid any dividends, the product of the mill barely sufficing to meet current expenditures and pay cost of necessary improvements made. The investment was a total loss, and this not through any glaring mismanagement, but simply because a great deal too much was paid for the property in the first place, and, because their ores, suffering some deterioration, became, at the same time, too base for treatment by simple mill process.

That the company instead of coming to a dead halt should have put up furnaces, roasted their ores and gone ahead, is the opinion of many well informed persons; our British cousins illustrating in their action on this occasion a disposition frequently manifested in their dealings with American mines—taking hold too brash and letting go too soon. Seeing the worthlessness of many of the properties put off on these people they no doubt acted wisely, however, in thus speedily dropping the most of them as they did, on the principle that no incubation, however protracted, can bring anything out of a rotten egg.

The Immigration Association of California.

How the Fame of the State is Being Spread Abroad.

The leading factor in the immigration movement now in progress toward our State, is the Immigration Association of California, which has its headquarters at No. 10 California street. The Association has its spacious rooms well filled with valuable records of the available government lands and testimony concerning the resources and adaptations of the State. It is continually doing vigorous work in sending information to the thousands who are applying for it, and is thus extending its work into all parts of the Eastern States and in Europe. Not less than 250,000 copies of a description of California in pamphlet form has been distributed.

The Association has advertised the resources of the State and its advantages in over 500 newspapers and periodical publications; secular, agricultural, and religious, having a wide circulation in the States east of the Rocky mountains and in Europe, and has caused the publication of elaborate articles upon California in English and other languages. The addresses of 20,000 farmers have been procured, comprising names from nearly every county in the western, middle, eastern, southern, and New England States.

Of French pamphlets, 5,000 of the same character, with State maps, have been distributed through agents at Havre and Bordeaux, France, and by various means in the United States.

Of German descriptions of California, with maps, 15,000 have been distributed by this office and through agents in the United States and England, Switzerland, Sweden, Holland, Brussels, Bremen, Hamburg, Holstein, Baden, Gera, Leipzig, Dresden, Nennminster and Austria.

Besides these, a large quantity of other printed matter, descriptive of local sections of the State, or treating on special topics of interest to immigrants and intending settlers, has been widely circulated, and 8,000 letters, postal cards, and circular letters, including those in foreign languages, have been sent to various parts of the world.

There have been distributed, throughout the United States and other English-speaking countries, direct from the office, through immigrant agents, railroad and steamship offices, and otherwise, 60,000 publications descriptive of the State, with 40,000 State maps.

These measures have brought forth numerous inquiries, and a large, direct, and continuous correspondence. Information of the most varied character in reference to all conditions and all industries of the State has been asked from and furnished by the Association. Letters to the number of 10,000 asking for information have been received, representing every State east of the Rocky mountains and many foreign countries, viz., Germany, England, Switzerland, France, Italy, Sweden, Austria, Russia, Belgium, Hungary, Poland, British China, New Zealand, Hawaiian Islands, and Australia, besides a large number addressed to our agents in some of these countries. Letters have been received from as many as twenty-seven States in a single day, besides those from foreign countries.

The number of actual personal applicants for land who have registered at the office is over 2,000. These represented every State in the Union and many foreign countries. The Land Officer's report shows what disposition has been made of these people, by way of directing them to homes.

The Association has kept up a continuous agitation in favor of the bill now pending in Congress, to prevent the unlawful occupation of the public lands, by furnishing members of that

body and committees, with different written and printed statements in reference to it.

The Association has been placed on the mailing list of different departments at Washington, and many statistical and other reports have been received for its library.

Thirty-three State newspapers are kept on file in the reading-room for the benefit of immigrants and many specimen California products are set forth for examination.

Work of the Land Officer.

With the aid of one assistant for ten months, a list has been made of all the lands in the San Francisco, Stockton, Sacramento, Marysville, Shasta, Valisala and Los Angeles land districts, and in Lassen county of the Snsaville district, in California, belonging to the United States.

These lands have been indicated on township plats, which have been bound in books by counties, making fifty-four books and nearly 5,000 plats.

The United States Surveyor-General's field notes, so far as deemed necessary for immediate use, have been copied on the same plats, or are being copied, showing, in a general way, the topography, character of the soil, timber, water, and availability for farming or other purposes, of each township, and more particularly showing the character of the four sides of every section. Thus a general description of each six square miles is shown, and a particular one of each 160 acres.

Nine hundred township plats in the United States Surveyor-General's office have been copied, comprising eleven counties, which are bound in twenty substantial volumes, similar to books of like character in United States land offices. These plats show all the streams, Spanish grants, lands owned by private parties and by the United States Government, and give a brief general description of the land.

The work, in eleven different counties, has been concentrated in county maps, showing at a glance all the public lands and their general character, also the private and railroad lands and Spanish grants.

Much information has been procured through the 150 letters from actual residents in different sections of the State, all bearing upon the advantages or disadvantages of the Government lands for the settlement of immigrants, and which is kept in a book for public inspection.

Scraps of interest to immigrants have been clipped from State papers, treating of the resources, general and special advantages of the different sections, and of particular crops or interests of the State in general, which have been arranged in two scrap books, one of the counties, and the other a book of general information. In addition to these, 32 scrap books have been opened, one for each county, and 23 others upon special topics.

Personal examination has been made of certain localities in San Luis Obispo and Mendocino counties, where there was reason to believe good Government land was to be found. It is designed to rapidly extend this work.

Maps of ten different counties, two of the State, and one of the United States, have been donated by individuals, County Supervisors, and the Interior Department of the United States. With those made in the office, we have twenty-one county maps in all.

A vast amount of Government land in the State has been found suitable for farming, and immigrants may be invited to occupy them without limit. If this were not proven to be true, new comers would have to depend wholly upon buying land of private holders at higher prices, and immigration would be slower and development longer delayed. Other States having large quantities of free as well as cheap lands to sell on long time, with low rates of interest, would have greater immediate growth, as well as permanent advantages.

Although the work is not half done, the Association begins to feel that it has not been in vain, and are better prepared to tell immigrants the exact location and character of the Government lands than any other State has ever been. A summary of the estimates of the Association concerning the character of the lands is as follows:

Area of California.....98,500,000 acres.
Area of unencumbered Government land.....43,795,600 acres.
Area suitable for lumbering, mining and other pursuits.....16,295,000 acres.
Area suitable for some agricultural purpose.....21,500,000 acres.
Area of lakes, bays, navigable rivers and lands steep or rocky, or otherwise not productive.....6,000,000 acres.

Where the Land is

The Plat Books of the Association show public lands subject to entry as follows:

Counties.	Acres	Counties.	Acres
San Luis Obispo.....	450,000	Tehama.....	850,000
Monterey.....	600,000	Sierra.....	210,000
San Benito.....	250,000	Yuba.....	40,000
Santa Clara.....	150,000	Butte.....	155,000
Santa Cruz.....	40,000	Siskiyou.....	2,655,000
Napa.....	40,000	Siskiyou.....	455,000
Sonoma.....	165,000	Calaveras.....	65,000
Lake.....	450,000	Stanislaus.....	65,000
Mendocino.....	1,500,000	Merced.....	190,000
Shasta.....	1,500,000	Placer.....	735,000
Lassen.....	2,700,000	Nevada.....	255,000
Colusa.....	235,000	Amador.....	365,000
Yolo.....	655,000	El Dorado.....	5,900,000
Tuolumne.....	655,000	San Bernardino.....	320,000
Santa Barbara.....	150,000	Los Angeles.....	2,500,000
Ventura.....	150,000	San Diego.....	18,180,000
Kern.....	2,000,000	In other 17 counties.....	42,295,000
Tulare.....	2,000,000		
Total.....			1,500,000

The description of these and other public lands has been published in circular form, and is being daily distributed to all parts of the world in large numbers.

Settlements have been begun in Mendocino, Lake, Shasta, San Luis Obispo, and Monterey

counties. Between 1,500 and 2,000 people have procured directions from the Land Office of the Association, and been sent to these and other counties of the State. How many have actually located, they have no accurate means of determining, but as very few of those sent out return, and those who do, go again to other points, they conclude that a large portion of them have settled.

What is Done for the Home Seekers.

Applications for information by letter are all carefully attended to. When the printed matter of the Association meets the expressed wants of the applicant, this is sent. Whenever special information is needed individual letters are written. The mails bring communications from twenty to twenty-five different States and countries each day. On the arrival of immigrants at the offices of the Association, each man is asked concerning the kind of farming he desires to follow, and if he has a predilection for any particular part of the State. If he has these he is furnished with plats showing the Government land suited to his needs or in the locality he chooses, and he then sets out to examine the lands and make his selection. He is also given letters of introduction to men whom the Association knows and trusts in the different regions. Nowhere else is such definite work for the benefit of individual applicants done as by our California Association.

Eastern and Foreign Connections.

The Association now has an agent at Council Bluffs, Iowa, who is weekly organizing companies of immigrants, and sending them on with the information they need. The agent is D. N. Horn, and he seems to be pursuing his work with vigor.

The Association is now preparing to send Mr. Paul Ocker to Germany, to bring out thence a company of immigrants by the New Orleans route. Mr. Ocker has already brought in several parties from Colorado.

Work is also being done at the east by the agents of the railroad companies, and wherever an opportunity is found to put the information concerning the State in good hands, it is adopted. So far as our observation goes, the office in this city is managed with much zeal and skill, and reflects much credit upon the Secretary, Mr. Street.

The Association and Its Officers.

This Association is supported by and is under the control of the business men of San Francisco. It is organized for the purpose of furnishing free information concerning California, and to assist immigrants in finding employment and permanent homes in the State. All possible care will be taken to have the information given by the Association clear and reliable. The revenue of the Association is derived from voluntary subscriptions. The receipts are now about \$800 per month received from 125 subscribers.

The officers are as follows: Arthur R. Briggs, President; Wm. L. Merry, Vice-President; W. Steinhart, Treasurer; C. H. Street, Secretary and Land Officer.

Board of Directors—Jas. R. Kelly, Wm. L. Merry, C. W. Whitney, Wm. Blanding, W. N. Hawley, W. Steinhart, T. L. Barker, J. V. Webster, Arthur R. Briggs.

Executive Committee—Jas. R. Kelly, T. L. Barker, Wm. Blanding, J. V. Webster, Arthur R. Briggs.

Southern Nevada.

The Carson Tribune thinks it may, with truth, be said that Nevada is having her dark day, and such is invariably the case in mining districts, especially so where enormous amounts of precious metals have been extracted from mother earth. In the early days of river mining in Sierra county, and other districts of California, money was easily made and as quickly spent, miners made thousands of dollars by their sluices, and sunk it in running bed-rock tunnels, in the endeavor to strike gravel deposits, and hundreds, aye thousands, of the venturesome ones sank their all, and were away their lives in labor in the attempt. Camps were deserted as worked out, and but few remained to look for precious metal in quartz lodes, but those who did so were afterward rewarded by striking fortunes in finding quartz leads in a locality where it was supposed nothing but placer diggings prevailed. In those days, mining was a legitimate business, and continued so until the great Comstock was discovered, since which time it has become a thieving, rascally, stock-jobbing affair; the miners on the Comstock have been systematically robbed of their wages, and the proceeds of the mines have gone into the pockets of the few, and thus the hard times that now afflict the people of the State were brought about. The Carson & Colorado railroad has opened a way for miners to go forth, as of yore, and with their picks develop quartz, which they can get hauled to mills and have worked without being robbed of the proceeds; men of means stand ready to purchase pay ore from those who extract it, and so a new era has commenced in mining matters. To improve the times, men must do as in the early days of the Pacific coast, leave the old and used up Comstock, take their blankets on their backs and strike out into the new country opened out by the private means of the owners of the Carson & Colorado railroad, for in the southern part of the State there is a greater Comstock than Storey county ever held within her rocky hills.

MECHANICAL PROGRESS.

Sources of Injury to Boilers.

Leakage at the girth seams and around the tubes at externally fired, horizontal tubular boilers is one of the defects most often found, and one which is sure to become very serious in a short time if not attended to, for it induces corrosion in one of its most dangerous forms. There is nowhere to be found a better illustration of the truth of the old saying, "A stitch in time saves nine," than in this matter; and also no better illustration of the economy and value of proper care and management for steam boilers. Leakage at the seams of boilers may be induced by a variety of causes, of which we need here mention only two—bad workmanship and bad management. When the defect is due to bad workmanship the only help for it is, generally, to dress and recaulk the edges of the plates. Sometimes, though not often, it will be necessary to cut out the old rivets, insert new ones, and then dress and recaulk. This also is generally necessary when a boiler has been overheated through shortness of water or otherwise. Sometimes too much lap is given the plate, when it becomes impossible to properly caulk the seams. The writer has in mind now a certain rotary bleacher, whereon the plates lapped four inches beyond the rivets. The result may be imagined. Obviously the only remedy in such a case is to reduce the lap.

Leakage is often induced by feeding cold water into a boiler, and delivering it close to the hot plates over the fire. Severe local contraction is thus caused, which no material can resist, and leakage is sure to follow. The solid plates of the shell are very frequently fractured in this manner. Where the use of cold water is unavoidable, the boiler should always be provided with a circulating feed pipe as a means of economy and safety. In too many cases, however, the seams are shaken by the habit which prevails extensively of pulling the furnace doors wide open without closing the chimney damper. This is a very common way of checking the generation of steam when there is a lull in the demand for it from any cause, and cannot be too strongly condemned. The effect of a large body of air of some hundreds of degrees colder than the furnace and boiler, rushing along the under side of the shell, is sufficient to loosen the best joint that ever was made, and in many cases it has fractured the shell through the solid plate. The effect of this is even more marked with some types of internally fired boilers, such as the "drop-flue," for instance, than it is with the common return tubular boiler.

Another fruitful source of damage to boilers, and one which has ruined thousands, is the practice of blowing a boiler off and immediately refilling it with cold water while the brick-work is red hot. Nothing will tear a boiler to pieces quicker than this. Boilers have exploded with disastrous effects from this cause hours after the fire had been withdrawn. Probably most persons not familiar with the matter would be surprised to know the pertinacity with which cold water will cling to the lowest point of a boiler under these circumstances. Local contraction of such severity is thus induced that nothing can withstand its effects, and a few repetitions are generally sufficient to ruin any boiler.—*The Locomotive.*

A NEW STYLE LOCOMOTIVE.—Strong's express locomotive is a novelty in this country, and bids fair to spring into general use on every road where its merits are properly appreciated. The designer of the engine spent a long time in England and on the continent, taking note of all the good points in locomotives used abroad, and upon his return constructed an engine embodying the results of his studies. In the boiler of Mr. Strong's locomotive, the corner bars and side stays are done away with, the fire-box is designed to insure complete combustion of fuel by burning the gases and sparks, the driver coupling so arranged that the side rod is unnecessary, and there is also a better distribution of wearing surface on brasses or crank-pins than is the case in ordinarily constructed locomotives when the power for both wheels is transmitted through the forward pin. The valve motion is also improved, and the feed water heated by a portion of the exhaust. In short, the locomotive is so constructed as to be economical and fast as it is desirable, and always have a reserve of power for a heavy train, while at the same time it is simple, and not liable to derangement, and safe for those who run it, as well as those who ride behind it, and one that shall burn its coal in so perfect a manner as to do away with the cinders and smoke.—*North American.*

POWER OF BELTING.—Horse-power of a belt equals velocity in feet per minute, multiplied by the width—the sum divided by 1,000. One inch single belt, moving at 1,000 feet per minute=1 horse-power. Double belts about 700 feet per minute, per one inch width=1 horse-power. For double belts of great length, over large pulleys, allow about 500 feet per minute per one inch of width per horse-power. Power should be communicated through the lower running side of a belt, the upper side to carry the slack. Average breaking weight of a belt, 3-16x1 inch wide—leather, 530 pounds. Three-ply rubber, 600 pounds. The strength of a belt increases directly as its width. The co-efficient of safety for a lace belt is: Leather=1-16 breaking weight; rubber=½ breaking weight.

How to Select a File.

On purchasing a file bear in mind that there are several qualities—first, second, third and fourth. The first quality is the best, and represents about seventy-five per cent of a manufacturer's product. Firm names are always stamped on files before they are tempered, and if, after they are finished, any of them are found to be poorly cut, or badly tempered, the firm name is ground off and one of several fancy names, coined for all qualities below the first, is stamped on each file belonging to a certain quality. Thus, if a file-maker should select the word "Jumbo" for his second quality files, all too poor for the first quality and too good for the third have "Jumbo" stamped on them. First quality files only bear the name of the maker, while fourth quality generally bear no name at all, and are seldom seen.

When you have thought of all these things, ask the dealer for a first quality file, bearing the name of a well-known file-maker. Select the heaviest file in the box (if there is any difference in the weight of them), for a heavy file is generally truer than a light one of nominally the same size, and is better for re-cutting; a re-cut file, by the way, being just as good as a new one. Take the file to the light and hold it in a horizontal position, the point of it toward you. The teeth will now be pointed toward you, enabling you to detect easily any imperfections that a bad file is heir to. If the conformation of the teeth is irregular or uneven, or if the color of the file is not uniform, let it severely alone. A spotted or mottled file denotes unevenness of temper. If, on the other hand, the file presents a clean, white color, it denotes that the temper is even throughout; and if, besides this, it has regular and perfect teeth, and bears the maker's name, you may rest assured that it is an excellent file. The best files are tempered at a low heat. Files of certain sizes and numbers made since the first of last June are of uniform weight, the file manufacturers of the United States having agreed upon a standard of weights and sizes.—*Manufacturer & Builder.*

WHAT NEXT?—The possibilities of human invention are almost unlimited, and when, in the light of the improvements of the last half century we attempt to surmise what the next hundred years may bring forth, we are lost in the possibilities of what may be. When the web press was introduced, which enabled our large dailies to dispense with hand feeding, and by stereotyping their forms and putting their paper up in webs to roll out their editions at the rate of 20,000 folded copies per hour, it was thought that the printers' millennium was pretty near at hand; but in the *American Patent Office Gazette* for February 13, we find a patent issued to New York parties for a machine, whereby the papers are wrapped and addressed as they come from the press, and by an electrically connected switch, which is automatically operated by the passage of a metallic stencil hand, sorted according to their post office addresses. *Cotton, Wool and Iron*, mentioning this remarkable invention, thus soliloquizes: "The next move will probably be a pneumatic tube, so that the machine can spit the papers, all assorted, right into the post office. We have now half a dozen kinds of type-setting machines, and if some one will only get up a patent automatic, self-adjusting, double back-action, cast-iron editor, the only man we shall need to keep about a newspaper office will be a porter to sweep up and lock the door after the edition is off."

THE EFFECTS OF PUNCHING ON METALS.—As early as 1869, M. Tresca began to study the effects produced on metals by punching, and even prepared a formula by means of which it was possible to calculate the form of the piece punched out. At the meeting of the Paris Academy of Science, on March 26th, M. Tresca produced some prisms of metal that had been subjected to the operation of punching by powerful American machines, and, although the penetration of the metal had been effected under conditions differing from those contemplated in 1859, the correctness of the general formula was found to be borne out by practice. M. Tresca drew attention to the fact that the internal motion of the substance varied according as the face of the punch was plane or lenticular. There is also this curious fact, that, when the face of the punch is plane, it does not enter into actual contact with the metal, on account of a depression made therein by the advancing punch, and which continues to the end of each operation of punching.

COLD AND HOT-SHORT IRON.—A Sheffield, Eng., iron founder has made a series of tests with samples of iron plates, with the view to ascertaining the heat or temperature at which iron that is neither cold nor hot-short is liable to fail in bending and is unsafe for work. He observes that iron is very similar to steel in this respect, but that the fractures are different, for while steel, at a certain temperature, fractured nearly through the sample, on account of its homogeneous character, iron fractured to the depth of one or more of the layers constituting the plate. Iron plates being made from a pile of various bars, according to the weight, size and quality of the plate required, frequent laminations occur. The experiments seem to show that the temperature most dangerous to the metal—that at which it is most liable to fail in bending than if bent cold—is from 400 to 450 degrees.

SCIENTIFIC PROGRESS.

The Storage of Electricity.

A contemporary correctly says that the interest of all who follow the advances in the application of electricity to the arts, is centered at present in the so-called storage batteries or accumulators. The dynamo machine, driven by the steam or water power, has solved the problem of producing electricity in any desired quantity, and at reasonable cost as compared with the old cumbersome and inconvenient chemical battery; and the development and perfection of this machine has really given the great impulse to the cultivation of electrical science and its useful applications that characterize the present time.

But it will be readily understood that the perfection of an apparatus whereby the power given out by these electrical generators may be stored up, kept for any period, and given out as desired, either in the form of light or motive power, would be an immense advantage, and would signalize a real advance in civilization. It would solve at once, and perfectly, the problem that is now engaging the attention of so many inventors; namely, that of introducing into our homes or places of business, a small, convenient power for sewing machines, elevators, etc., or for domestic lighting by electricity. It would place at our disposal a source of power in a compact, convenient, and portable form, that would be found serviceable in thousands of situations, and for thousands of uses. Whether or not the present forms of storage batteries, and particularly the system originally devised by Plante and improved by Faure and others, are capable of being so far perfected as to meet these expectations, the future alone can decide.

Mr. Edison, whose name and prestige as an electrical inventor entitle his opinions to much respect, as we have already stated in these columns, is reported to have lately said in substance the storage battery is a delusion—something that looked very well in theory, but could not be made to work in practice.

From what has already been accomplished in this field, however, we are firmly convinced that the day is near at hand when the problem of the storage of electricity will be solved in such a manner as to satisfactorily meet every requirement, if not with the systems now in vogue, then with others. Enough has already been accomplished to show that the theory of electrical storage is correct, and that the difficulties to be overcome in realizing the theory in practice are not insurmountable. Such being the case, with the incentive of the incalculable utility of the invention to urge them on, and the fact that the problem is being studied by the most accomplished and learned electricians of the day, we look forward to the solution of the problem as a matter of course. It is worthy of remark, also, in this connection, that Mr. Edison, if he is correctly reported, stands practically alone among electricians in his contemptuous opinion of the future of the storage battery.

At the present time, the storage battery has been so far perfected for practical uses that it is now employed for many purposes, where small power is required. In regard to its efficiency, some careful experiments were recently made at the Conservatoire des Arts et Metiers, in Paris, by a committee, of which M. Tresca was President. The battery experimented upon consisted of thirty-five cells, weighing about ninety-five pounds each, or, in all, say one and a half tons. It was charged by a Siemens machine, which absorbed the energy of one-horse power for thirty-five hours. Of this mechanical energy, thirty-four per cent was expended in useless work in the machine and battery during the operation of charging, and sixty-six per cent was stored as chemical energy in the battery. Of this stored energy, sixty per cent was recovered as electric energy. In other words, the actual work of one horse for thirty-five hours, after being stored in one and a half tons of battery, could be recovered to the extent of about fourteen hours' work of one horse, or the equivalent of the same in electric or other energy.

Although the above statement does not make a very high showing as regards efficiency, the committee making the experiments, remark in their report: "In many cases the loss would be fully counterbalanced by the advantage of having at hand, and entirely at one's disposal, so abundant a source of electricity." The main sources of loss are, first, local action between the negative lead plate and the peroxide of lead deposited upon it; and second, the resistance of the oxide and sulphate to the passage of the current, by reason of which energy is lost by being converted into useless heat in the battery, both at charging and discharging. By regulating the discharge of the battery so as to reduce this loss, and by giving seasons of repose, in which the battery recovers some of its deterioration, Messrs. Perry and Ayrton have succeeded in recovering eighty-two per cent of the energy put into one of these batteries.

Though the interest in the development of the storage battery centers chiefly in its application for lighting, it is very probable that its capability as a source of power in the small way, will prove to be most valuable, and that the time is not distant when power for sewing machines and for electric lighting in our houses will be delivered daily by express wagons.

The Great Red Spot on Jupiter.

Mr. G. D. Hiseox communicates an article to the *Scientific American*, in which, after alluding to the fact that the intensity of this spot seems to be vanishing after a duration of about two and a half years, he offers some speculation as to the philosophy of its occurrence, as follows:

The two periods of rotation of the spot are observed to vary about five and a half minutes; giving the rotation by the cloud spots as 9 h. 50 m. to 9 h. 50 m. 9 s., while the rotation by the great red spot is found to be 9 h. 55 m. 34 s.

The times given for rotation by observations upon different cloud spots also vary enough to give us, together with the varying contour of the cloud belt, strong evidence that what we see of the planet Jupiter is not the body of the planet itself, but rather a vast sea of cloud, possibly thousands of miles in depth, kept aloft by the intense heat of the body of the planet.

From the well known laws of circulation of gases, vapors, and cloud masses, as illustrated by the circulation of the atmosphere, together with the progress and direction of the great storms, cyclones, and tornadoes upon the earth, and as are beginning to be elucidated in the cyclone action of the sun spots, according to Faye's theory, which best meets the conditions deduced from spectroscopic observations; we cannot do otherwise than come to the conclusion that the solid body of Jupiter has never been seen—that our observations are only of the surface of vast envelope of cloud, that by its rapid rotation is constantly creating and keeping up an intercirculation, such as our trade winds and equatorial doldrums, upon a vast scale.

In this connection we have only to carry our minds back to the beginning of the Aztec age of our world, and to imagine the surface just erupting over and still red hot in zones, with our entire oceans hanging as a vast cloud above, and precipitating its dense vapors as rain upon the hot and hissing surface. It was then that the activity of natural forces were at their height. It was then that the upheaval of the intensely heated masses from below met the cloud bursts from above, and produced the same class of phenomena that has lately been observed, upon a vastly larger scale, upon the planet Jupiter.

If, in view of the density which has heretofore been given for Jupiter, we can reasonably accept an atmospheric or cloud depth of eight or ten thousand miles, the apparent great diameter of the red spot may be assumed as only the irradiation to, and illumination of the deep cloud stratum by an igneous mass, much smaller than the apparent size of the red spot, as we see it from the earth.

The size of the great spot, 26,000 by 8,000 miles, may be, for a planet 88,000 miles in diameter, only the illumination of a reasonable upheaval of the highly heated mass of the interior corresponding with the remains of such masses upon our earth.

The apparent retrograde motion I think is illusory, for I see no tenable reasoning to sustain the theory that has been advanced that it is a floating island, or crust floating upon a liquid surface. Nor does there appear any good reason for regarding it as of a periodical character, or bearing any relation to other periodical physical phenomena, as suggested by the Dearborn observer. But, on the other hand, an assertion in the report of the Dearborn observations, "that the apparent center of the red spot does not coincide with the true center, except when on the central meridian," goes far to explain the theory that the red spot, as seen by the telescope, is an area of the outer cloud stratum illuminated by an igneous mass upon the body of the planet. And also that its diurnal rotation should be fixed by the observed rotation of the red spot, instead of, as heretofore, by the rotation of the cloud spots.

THE ELECTROSCOPE.—The most astonishing claim yet made in behalf of electricity is that it has been proven possible to convey by its vibrations of light, so that it is practicable not only to speak to a distant friend, but to see him. According to the *Otago Times*, Dr. Guidrath, of Victoria, has invented an apparatus, called by him the electroscope, which accomplishes this. The paper in question says that a public test of this instrument was made in Melbourne in the presence of some forty scientific and public men. "Sitting in a dark room, they saw projected on a large disk of white burnished metal the racecourse at Flemington, with its myriad hosts of active beings. Each minute detail stood out with perfect fidelity to the original, and as they looked at the wonderful picture through binocular glasses, it was difficult to imagine that they were not actually on the course itself, and moving among those whose actions they could so completely scan."

PHOTOMICROGRAPHY.—Dr. G. M. Sternberg, U. S. A., delivered a lecture Tuesday evening before the San Francisco Microscopical Society, of which the Doctor is an honorary member. His subject, "Photomicrography," was illustrated with the camera, with the aid of which he exhibited views of the minute parasites which science has connected with diseases of man and animals, prodigiously magnified, showing distinctively every line and member of their infinitesimal organisms. The views were excellent, and were witnessed with profound interest by a large audience.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T SALE.	SECRETARY.	PLA OF INESS		
Alta S M Co.	Nevada.	21.	25. Apr 10.	May 15.	Jun 4.	W H Watson.	302 Montgomery st
Argenta M Co.	Nevada.	15.	25. Mar 20.	Apr 23.	May 14.	E M Hall.	327 Pine st
Bodie Com M Co.	California.	2.	50. Mar 5.	Apr 16.	May 16.	G W Sessions.	309 Montgomery st
Belcher M Co.	Nevada.	32.	25. Apr 21.	May 24.	Jun 12.	J. Crockett.	327 Pine st
Belmont M Co.	Nevada.	7.	25. Apr 30.	Jun 4.	Jun 25.	C C Harvey.	309 California st
California M Co.	Nevada.	7.	20. Feb 27.	Apr 6.	May 4.	C P Gordon.	309 Montgomery st
Campo Seco Copper M Co.	California.	1.	5. Apr 27.	May 31.	Jun 20.	D Buck.	309 Montgomery st
Challenge Com M Co.	Nevada.	2.	10. Mar 27.	May 2.	May 23.	W E Dean.	309 Montgomery st
Chollar M Co.	Nevada.	11.	50. Mar 27.	Apr 30.	May 21.	W E Dean.	309 Montgomery st
Con Imperial M Co.	Nevada.	19.	5. May 2.	June 8.	June 27.	W E Dean.	309 Montgomery st
Con Pacific M Co.	California.	6.	15. Mar 22.	Apr 30.	May 23.	F E Luty.	330 Pine st
Caborea M Co.	Mexico.	7.	10. Apr 20.	May 21.	June 6.	W L Elliott.	220 Sansome st
Day S M Co.	Nevada.	12.	30. Mar 12.	Apr 26.	May 21.	E M Hall.	327 Pine st
Elko Com M Co.	Nevada.	1.	15. Apr 10.	May 15.	Jun 7.	P Sperling.	309 California st
Eureka Com M Co.	California.	3.	100. Mar 16.	Apr 19.	May 14.	P Jacobins.	309 Montgomery st
Grand Prize M Co.	Nevada.	13.	25. Mar 15.	Apr 16.	May 7.	E M Hall.	327 Pine st
Golden Fleeced Gravel M Co.	California.	23.	35. Apr 20.	May 25.	Jun 16.	P Schreiner.	785 Folson st
Independence M Co.	Nevada.	10.	100. Mar 29.	Apr 10.	May 2.	J W Pew.	310 Pine st
Julia Com M Co.	Nevada.	18.	10. Apr 10.	May 14.	Jun 4.	H A Charles.	419 California st
Lady Washington M Co.	Nevada.	3.	5. Apr 21.	May 24.	Jun 13.	W H Watson.	302 Montgomery st
Martin White M Co.	Nevada.	14.	25. Mar 22.	May 2.	May 31.	J I Scoville.	309 Montgomery st
Mount Potosi M Co.	Nevada.	9.	50. Apr 20.	May 7.	May 28.	J H Sayre.	330 Pine st
Ophir M Co.	Nevada.	44.	50. Apr 20.	June 1.	June 21.	C L McCoy.	309 Montgomery st
Potosi M Co.	Nevada.	11.	25. Mar 21.	Apr 24.	May 15.	W E Dean.	309 Montgomery st
Scorpion M Co.	Nevada.	15.	10. Apr 10.	May 10.	May 31.	G R Spangney.	310 Pine st
Sierra Nevada S M Co.	Nevada.	76.	100. Mar 29.	May 2.	May 21.	F L Parker.	309 Montgomery st
Tip Top S M Co.	Arizona.	5.	25. Mar 8.	Apr 16.	May 14.	H Deas.	309 Montgomery st
S Maguel & La Trinidad M Co.	Mexico.	1.	100. Jan 29.	Mar 8.	Mar 29.	H Nielsen.	210 Front st
Summit M Co.	California.	10.	50. Mar 16.	Apr 30.	May 25.	R N Van Brunt.	318 Pine st
Union Com M Co.	Nevada.	22.	50. May 2.	June 6.	June 26.	J M Buffington.	309 California st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Buchanan G M & M Co.	California.	2.	05.	Mar 30.	May 2.	June 1.	P J Sullivan.	121 Post st
Lima Com S M Co.	Arizona.	6.	05.	Apr 4.	May 15.	Jun 5.	R D Hopkins.	436 Montgomery st
Lucky Hill Com M Co.	Nevada.	2.	10.	Apr 2.	May 4.	Jun 4.	H A Ulrich.	37 Ellis st
M Hillen S M Co.	Arizona.	5.	20.	Mar 8.	Apr 12.	May 10.	J Morizio.	328 Montgomery st
San Pedro M Co.	Arizona.	8.	05.	Mar 6.	Apr 10.	May 2.	H Deas.	309 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Indian Spring Drift M Co.	California.	A B Paul.	328 Montgomery st.	Annual.	May 3
Justice M Co.	Nevada.	R F Kelly.	419 California st.	Annual.	May 7
La Grange Ditch and W Co.	California.	A Halsey.	320 Montgomery st.	Annual.	May 7
Morgan M Co.	California.	R L Tilden.	800 Market st.	Annual.	May 5
New Coso M Co.	California.	R L Shainwald.	320 Sansome st.	Annual.	May 9
Shawmut M Co.	California.	J F Bacon.	316 California st.	Special.	May 2

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAVABLE.
Bulwer Com M Co.	California.	W Willis.	309 Montgomery st.	.05.	Apr 12
Contention Com M Co.	Arizona.	D C Bates.	309 Montgomery st.	.25.	Apr 28
Jackson M Co.	Arizona.	D C Bates.	309 Montgomery st.	.10.	Apr 27
Kentuck M Co.	Nevada.	J W Pew.	310 Pine st.	.10.	Apr 19
Navajo M Co.	Nevada.	J W Pew.	310 Pine st.	.25.	Apr 18
Northern Belle M & M Co.	Nevada.	Wm Willis.	309 Montgomery st.	.50.	Apr 15
Silver King M Co.	Arizona.	N. A. Nelson.	315 California st.	.25.	Apr 15
Standard Com M Co.	California.	Wm Willis.	309 Montgomery st.	.25.	May 12

Table of Highest and Lowest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR 11.	WEEK ENDING APR 18.	WEEK ENDING APR 25.	WEEK ENDING MAY 3.
Alpha.	1.25	1.75	1.25	1.30
Alta.	.25	.45	.20	.30
Andes.	.55	.60	.50	.60
Alhion.	.50	.60	.40	.50
Argenta.	.55	.60	.50	.60
Atlas.	.55	.60	.50	.60
Belcher.	.55	.60	.50	.60
Bell.	.55	.60	.50	.60
Bodie.	.55	.60	.50	.60
Benton.	.55	.60	.50	.60
Bodie Tunnel.	.55	.60	.50	.60
Challenger.	.55	.60	.50	.60
Chollar.	.55	.60	.50	.60
Confidence.	.55	.60	.50	.60
Con Imperial.	.55	.60	.50	.60
Con Virginia.	.55	.60	.50	.60
Crown Point.	.55	.60	.50	.60
Day.	.55	.60	.50	.60
Elko.	.55	.60	.50	.60
Eureka.	.55	.60	.50	.60
Eureka Tunnel.	.55	.60	.50	.60
Excelsior.	.55	.60	.50	.60
Grand Prize.	.55	.60	.50	.60
Gould & Curry.	.55	.60	.50	.60
Hale & Norcross.	.55	.60	.50	.60
Holmes.	.55	.60	.50	.60
Independence.	.55	.60	.50	.60
J. H.	.55	.60	.50	.60
Justice.	.55	.60	.50	.60
Kentuck.	.55	.60	.50	.60
Martin White.	.55	.60	.50	.60
Monro.	.55	.60	.50	.60
Mexican.	.55	.60	.50	.60
Mt. Diablo.	.55	.60	.50	.60
Mt. Potosi.	.55	.60	.50	.60
Noonday.	.55	.60	.50	.60
Northern Belle.	.55	.60	.50	.60
North Noonday.	.55	.60	.50	.60
Navajo.	.55	.60	.50	.60
North Belle Isle.	.55	.60	.50	.60
Ophir.	.55	.60	.50	.60
Ophir.	.55	.60	.50	.60
Overman.	.55	.60	.50	.60
Oro.	.55	.60	.50	.60
Potosi.	.55	.60	.50	.60
Pinal.	.55	.60	.50	.60
Sage.	.55	.60	.50	.60
Sierra Nevada.	.55	.60	.50	.60
Silver Hill.	.55	.60	.50	.60
Silver King.	.55	.60	.50	.60
Scorpion.	.55	.60	.50	.60
South Nevada.	.55	.60	.50	.60
Syndicate.	.55	.60	.50	.60
Tuscarora.	.55	.60	.50	.60
Union Con.	.55	.60	.50	.60
Utah.	.55	.60	.50	.60
Valley.	.55	.60	.50	.60
Yellow Jacket.	.55	.60	.50	.60

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Stormont, April 24th, \$2,963; Ontario, 24th, \$11,000; Horn Silver, 24th, \$18,000; Ontario, 27th, \$6,530; Horn Silver, 27th, \$6,000; Yellow Jacket, 28th, \$9,728; Contention, 21st, \$22,624; Northern Belle, 26th, \$11,012; Bodie, 30th, \$14,730; Pinal Con., 11th to 22d, \$15,000; Standard, —, \$33,543; Navajo, 30th, \$14,100; Independence, 30th, \$6,000; Contention, 25th, \$11,850; Bodie Tunnel, 30th, \$2,063; Christy, 30th, \$4,190.

GRAVEL STRIKE.—A private dispatch from Downville states that the Bald mountain extension drift, and American hill hydraulic struck very rich gravel this week.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

LOYAL LEAD.—Amador Ledger, April 28: This quartz claim, adjoining the North Gover, near Drytown, and lately purchased by John Palmer and nine others, is to be prosecuted vigorously. The owners have moved the old Gover 10-stamp mill and placed it on the ground, and thoroughly repaired the same, and expect to get it started crushing some time this week. They are getting rock from the tunnel, which is 600 ft long, by working up on the ledge. There is plenty of rock to keep the 10 stamps going, and it is believed that it will pay well.

JACKSON.—After a period of idleness of several months, this quartz mine, otherwise known as the Ginochio claim, situated within the town limits of Jackson, resumed operations on Tuesday morning. The original bondholders, Messrs. Roberts, Adams and Peck, surrendered the bond in favor of a new company in San Francisco or Oakland, who are now proceeding with the work of development. The sum of \$2,000 was paid in liquidation of the old indebtedness, amounting to about \$5,000. A new bond will be given to the new company. W. L. Roberts is superintendent.

MAIMOTH.—The first clean-up of the mill of this famous bonanza mine, the property of W. A. Nevills, and situated in Middle Bar, was made Monday and Tuesday last. The run was for about 25 full days, most of the time, however, with only nine stamps, as one stamp was disabled, and had to be hung up. The run averaged 20 tons per day, or about 500 tons for the entire run. From all that we can learn from most trustworthy sources comestable, the yield far exceeded the most sanguine expectations. We are almost afraid to give an approximate of the output of gold, lest we should be put down as visionary. It is reported, however, that the clean-up realized somewhere between \$20,000 and \$30,000. Great chunks of gold were taken out of the batteries. One of the pieces is valued at \$140. In the mine, everything looks as well as ever, the streak of free gold continues about the same. All mining men who have seen this wonderful mine, unite in saying that nothing like it has been discovered in Amador county, and it bids fair to eclipse any mine now running in the State. The mill is idle for a few days, to enable some necessary repairing to be done.

MISCELLANEOUS.—I. N. Dewitt, Philbrook and four Austrians, are working on the first ledge struck in the Dewitt tunnel at Hunt's gulch. They have taken out 100 tons of rock, and are arranging to have it crushed at once. The Sinton Co., operating near Drytown, has secured the Maryland hoisting works, with the view of inaugurating sinking operations forthwith. The Canby Bros. had 60 tons of quartz from their mine near Volcano crushed this week at Down's mill. The yield, we are told, amounted to \$1300, or over \$21 per ton.

PLYMOUTH NOTES.—Cor. Amador Dispatch: Capt. Jenney is still prospecting on the Galileo and other ledges, with considerable success. We do hope that the Captain may be able to find something that will justify him in putting up extensive works as he is the best prospector that has ever been in this part of the country, or has ever been here, to our knowledge. The industry of the man is the thing that tells in this part of the country. The Vatican Co. have commenced sinking two new shafts, and are taking out large quantities of ore out of the old shaft, and the parties owning the mine say the prospects are much richer than ever before.

Calaveras.

WORK.—Mt. Echo, April 25: Work is progressing rapidly on Malone's Con. mine at Carson, and everything is apparently in a prosperous condition. A 40-stamp mill is in course of construction. The Gold Cliff is flourishing. Big clean-ups are being made. The new mill on the Confidence mine will be completed in a few weeks.

El Dorado.

GRAVEL MINING.—Mt. Democrat, April 28: The Cedar Springs mine, D. O. Cutter Supt., continues to pour forth its steady stream of the precious metal. On Saturday next a clean-up will be made after a five-weeks run, and there are good assurances that it will exceed by 30% to 50%, the result of the last clean-up, which was made after a four-weeks run and exceeded any former clean-up ever made in that mine, though for a long time it has been paying handsomely. Forty men are kept at work on this mine, and the shifts are so arranged that there is never any suspension of labor, even for an instant, not even to take meals, as the relief is set to work before the relieved men quit the mine. The gold turned out is of extra fine quality, commanding the highest price paid in the gold-dust market. Mr. Cutter is also superintendent of the Lyon and Kum Fa mines, which are under the same ownership as the Cedar Springs, and he is remembering the old Lyon tunnel for the purpose of working the Kum Fa ground through it, which latter, in the opinion of most old miners who are familiar with this section, is the most valuable gravel deposit in that vicinity. With the Blair gravel claim and the claims of Gignac and the E. D. W. & D. G. M. Co., at Texas Hill, and the Cedar and the Kum Fa in full blast, there is a promise of unprecedented returns from gravel mining in this neighborhood this fall.

BIG OPERATIONS AT THE SPRINGFIELD.—A contract has been let by Alvina Hayward to Prescott, Scott & Co., of the Union Iron Works, San Francisco, for machinery to be placed over a new shaft that is to be sunk on the Springfield mine, Mud Springs township, about 600 ft south of the present works. This machinery is to have a lifting power sufficient for workings 3000 ft in depth. It is to be supplied with a spur-gear hoist 12 ft in diameter and having a 12 inch face. It is to be run by water, with a Donnelly wheel from the Sutter Creek Pounding. A contract has been let for sinking the new shaft above referred to, a depth of 1000 ft. Blair brothers of this city have contracted to furnish 200,000 ft in lumber, 12 inches square, for timbering this shaft, a part of which will be delivered to-day. Masons have been down from this city during the week, laying the foundation for the new machinery.

ONION VALLEY MINING DISTRICT.—Georgetown Gazette, April 28: This district embraces a large

scope of country lying eastward from Gaddis creek, at an altitude of about 5,000 ft. The late rains have benefited this place considerably, and the mines are looming up at present with a fine supply of water. There are at present in active operation 13 mining claims, 6 being worked by the hydraulic process and 7 by sluices. The following creeks are at this time yielding gold in paying quantities: Onion, Bear, Sugar Pine, Bullion gulch, Ruby gulch, Grouse canyon (known as Finley's gulch,) Brush and Slab creeks. These creeks are from 1 to 5 miles long. There are also numerous other creeks, looking equally well, with an abundant supply of water, which are as yet unprospected. We have also numerous quartz lodes, but no quartz miners. There are also low lying channels here covered with lava, but no attempt has ever been made to get into them. The gold is generally found pretty deep in the bed-rock; hence mountain torrents must at some period have prevailed here. It may seem strange that our best prospectors and most successful miners here are young men who have done but little mining heretofore; they live by their claims winter and summer and improve every opportunity by getting them sluiced off during winter and spring, then clean up their bed-rock during the summer months. The "old timers" who come here generally returned without prospecting any at all, with the usual cry of "no gold."

Nevada.

A GOOD OUTLOOK.—Nevada Transcript, April 28: The Sherman Con., which was shut down a few days in order to make some required changes in the water pipes, again started up its new hoisting and pumping machinery, and expects to keep running regularly hereafter. Treviski & Laity have been awarded a contract for sinking the shaft 150 ft and they began their task last evening. Work at the Gold Flat Eureka, is temporarily suspended, pending the settlement of some matters in court. It is expected the mine will before long be in successful operation again. At the Mt. Auburn the 300, 450 and 600 levels are being steadily pushed northward to connect with the old Johnson shaft which was put down 90 ft in 1875 and is now to be reopened, sunk deeper, and made the main working shaft. The hoisting works are to be removed thence from their present location, as the incline through which the work is now being down is believed to be too far south to admit of the best part of the claim being worked to the greatest advantage. All the drifts show quartz of a good quality. It may be determined practical to remove the mill to a point in the canyon below, in order to give sufficient fall for introducing water as the motive power. In event of this change the mill and hoisting works will be connected by a tramway for the cheap and easy handling of ore. So little has been said in relation to the Mountaineer that few people besides those who are brought in contact with the company in a business way know of its existence. The mine is on Deer creek, about 600 yards this side of the Merrifield. The company have a 10-stamp mill, five of which are in operation night and day crushing rock from the mine. The ledge varies in size from two to four feet, and some of the specimen rock extracted is as rich as was ever taken out of any mine in the district. There are two ledges which are now coming together, and in a short time their true value will be known. The ledge that is now being worked is about two feet thick, and presents a very good appearance. If the property continues to look as favorable as now, the company will require hoisting works, which will be erected on the hill near the road. The property is owned mostly in San Jose, some stock being held in this city. At the Banner the 700 level is in 230 ft to the south and 260 to the north, work being prosecuted in both directions. A ledge shows in the south drift, and at times the ore found there is very good.

BUSY TIMES AT THE IDAHO.—Grass Valley Union, April 29: In and about the Idaho Works there is a scene of constant activity in the preparations being made for the introduction of water power. The line of 22-inch pipe has been laid from the reservoir down to a point about 1,000 ft from the works, and the water turned in, and is held at command by one of the gates. At the point the trial is being made of the different water wheels. Below this, toward the works, there are gangs of workmen, engaged in digging ditches and laying pipe, and before many days the whole line of pipe will be connected. The pipe now being laid down is all made at the works from 2-10th iron, the sheets being punched, rolled and riveted, and afterward immersed in a bath of coal tar. These pipes are all excellent pieces of workmanship, and made under the personal superintendence of Joseph S. Bonivert, who has no superior in the county as a boiler maker. As fast as the different joints are ready they are hauled by wagons to the point where needed and put in place. Millwrights are also at work framing the necessary timbers for the supports of the water wheels, of which five in number will be used for the several duties of hoisting, and running the batteries. Laborers are also engaged in digging out pits in which the wheels are to be set. A number of large wheels and other castings are on the ground, and the work generally is in quite a forward state, although the whole improvement is on so large a scale that it will take weeks yet to have everything in readiness to substitute water for steam in running all the machinery on the mine.

Placer.

FOREST HILL.—Cor. Placer Herald, April 26: As the mining industry is the most important hereabouts, that is what we first inquire into. The Excelsior Co. has been idle since the first of the month waiting the arrival of some of the owners, when arrangements will probably be made to sink a prospecting shaft on the Campbell ranch, then both shafts will be running at one time. At the Paragon, Messrs. Breech and Wheeler are driving ahead their bed-rock tunnel and with a few men are prospecting for the lead which was lost last summer. It seems strange that such a good paying channel should have stopped short all at once, but hopes are entertained that they will soon come on to it again. Messrs. Clark & Bequette are still working ahead with a large force of men. They are opening a very nice breast of gravel. In company with representatives of the Mayflower Co., I had the pleasure of going through the mine and saw some very nice looking gravel. The mine is being worked with a very large force of men. There are about 40 attending to the piping, etc., and no engaged sinking the new shaft. It is now about 150 ft deep. On Monday gravel was struck of a fair looking grade. It continues to improve in appearance the deeper they go, and is quite hard, which augurs well,

All interested in the mine feel very much elated. Over on Bushy the Adams Bros. are working their hydraulic claim with a crew of seven men. One day last week a 40-ounce piece of gold was picked up in Grinnell's diggings at Bath. Such pieces are rare and not often found now.

Plumas.
SOUTHERN EUREKA MINE.—*Greenville bulletin*, April 25: There is some talk of putting up more stamps at the mill of this mine; with what result may be expected when it is remembered that all the water that can now be got to the mill is not enough to supply the present capacity without being pumped back, and used over and over almost as long as it can be got to run at all. No other mine in the Greenville district has been less creditable to it than the Southern Eureka, and chiefly because it is impossible that it ever could or can be worked profitably with the mill in its present location. All who are interested in the district may well hope that the proposed addition to the mill may not be made, because if it is done the parties who invest the money with the expectation of getting it back through the mill will be disappointed, and further discredit will fall upon the district. That there is money to be made in the mine all competent judges who have examined it are agreed, but they are equally agreed that no money will ever be made with the mill where it now is.

GREEN MOUNTAIN MINE.—The tunnel has been in very hard ground during the past week or more. The rock is a gray quartzite, difficult to drill, and requiring more holes to be bored to advance a given distance than any hitherto found since the tunnel was started. Notwithstanding the character of the ground good progress has been made, and the ledge is likely to be made good that the ledge will be reached by the close of the month. The mills continue to run steadily.

GENESSEE MINE.—Mr. Eggleston, one of the parties interested is now at the mine, and last week engaged John Taylor as foreman. It is expected that the mill will be enlarged immediately and the mine worked upon a scale never attempted by the former owner.

Sierra.
ARASTRA.—*Mountain Messenger*, April 28: Jerome York has an arastra, in Slag canyon, running steadily, and confidently expects good pay, as he knows his quartz is rich. He says he knows more about an arastra than he did a month or two ago, for the simple reason that he bought and paid for the knowledge.

SIERRA CITY NOTES.—*Sierra County Tribune*, April 26: With the exception of Chinamen mining in the river, J. D. Newhouse was the only one we found digging for gold between Downieville and Loganville. Mr. Newhouse has a very pretty ranch and a nice residence. He also owns a gold mine. We found him, not hoeing in the garden, but manufacturing slickens out of the rich soil that composes the ranch. This is the kind of debris the Grangers are making such a howl about. Upon reaching Loganville we crossed the river to pay a visit to that famous quartz mine, the Marguerite. Famous, because we have been told that this little Sierra county mine has caused more excitement during the past year among the hells and bears of Boston than almost any other California mine. At the mine we found all bustle and activity. Everybody and everything seemed to be at work. We did not notice any idle hands around the premises. Supt. Shaw speaks well of our county and its bright future prospects. The 20-stamp mill is running regularly on good-paying ore. The condition of the mine is good. Since the Marguerite mine started up, somewhat over one year ago, Loganville has been gradually growing, until now it presents quite a town-like appearance. J. P. Deidesheimer, formerly a heavy owner in the Marguerite mine, was in Sierra City several days recently, on business connected with the Phoenix mine. We were informed that this mine would surely start up about the 1st of next month. It is estimated that there are a couple of hundred thousand dollars worth of ore already in sight at the mine. The Boston company, who will take hold of the property, proposes to push ahead work on an extensive scale this summer, in order to be well prepared for the coming winter season. The Phoenix ledge is located on the mountain side, similar to the Sierra Buttes ledge, and presents every advantage for working on equally as large a scale as that mine. Taking everything into consideration, Sierra City promises to develop into one of the most promising mining districts in the State.

Tuolumne.
POCKET.—*Tuolumne Independent*, April 24: Another large pocket was taken out at Tuttleton last week by a Cornish miner, near where the "Cardinal" strike was made, about 27 years ago. The miner was a stranger here, and went to work prospecting in the place that had been tramped over and worked around for years. He understood how this pocket "made," and got it—the same indications which led to the discovery having been for years exposed in an old shaft.

GEN. A. J. HATCH, of Nevada, is about to open the American tunnel, in conjunction with the Obar, in Table mountain, as soon as new track iron can be procured. The mine is paying far beyond expectation.

JOHNIE DAVIS, the enterprising miner, has a number of men at work on the Lamphier mine, near the old Confidence. They have a large vein showing well in ore. We have a number of specimens in our cabinet thickly set with free gold, taken from the mine a dozen years ago, when it was being prospected by Dave Baxter. Mr. Davis & Co. are making arrangements to erect a mill.

REOPENED.—*Union-Democrat*, April 28: The Divoll Bonanza mine has been reopened this week by Capt. Colby. As Colby is an experienced miner, and possessed of that confidential grit of which the majority of pocket miners are sadly deficient, we hope he will be successful. He has renovated the entire machinery connected with the mine, and intends running three shifts.

NEVADA.
Washoe District.

OPHIR.—*Enterprise*, April 28: On the 3100 level the joint Mexican east crosscut has been extended 28 ft. Are engaged in cleaning out and retimbering the old Central tunnel. The work of extracting ore from the croppings is continued.

UNION CON.—Have completed the winze chamber

in the joint Sierra Nevada east crosscut on the 2900 level. South drift No. 2 on the 2900 level has been extended 13 ft, and 91 tons and 1,600 pounds of ore extracted.

SURRA NEVADA.—The north lateral drift on the 2900 level has been extended 16 ft. The chamber for the winze in the end of the joint Union Con east crosscut on the 2900 level is completed. The north lateral drift on the 2900 has been extended four feet. During the past week there has been extracted from the north drift No. 2, on the 2900 level, 24 tons and 600 pounds of ore.

CROLLAR.—During the past week 56 ft were added to the length of crosscut No. 2, when further work at this point was discontinued. Since stopping this crosscut preparation has been made to start another, to be known as A, west from the main north lateral drift, at a point 92 ft north of crosscut No. 1. Everything is now ready, and the work of crosscutting will be started at once.

YELLOW JACKET.—The water in the mine remains at the same height, or stationary. At the Winters shaft we are extracting and shipping about 140 tons of ore daily. The north lateral drift on the Sagebrush level is now within 60 ft of our north line. The old ore stop is still on the east side of this drift. Work has been resumed in the north drift on the second level. On the 25th instant shipped three bars of bullion, valued at \$9,727.91.

Columbus District.

NORTHERN BELLE.—*True Fissure*, April 28: A crosscut has been started toward the footwall of the ledge found in the main winze, below the fifth shaft level. It begins at the east end of the drift from this winze, and has been extended 14 ft during the week. A crosscut from the fifth shaft level, at a point 200 ft from the shaft, has opened a body of black sulphurates, eight inches in width, which looks very promising. The crosscut is now in 28 ft, and will be continued until the footwall is reached. The southwest drift from the same level has advanced 10 ft, being now in a total distance of 56 ft. At this point a crosscut will be run in the same direction as the one just mentioned, and will enable a thorough prospecting of this section of the fifth shaft level. The stope from the fourth shaft level is yielding well and presents a promising outlook for the future. The stope from the first shaft level shows no diminution either in the quantity or quality of their ore production. Both mills are running steadily and doing good work. Five of the stamps of mill No. 2 are engaged in crushing custom ore. The hullion shipment was \$25,824.44 for the week ending April 26th, and amount to \$75,706.87 for the current month to the same date.

MOUNT DIABLO.—The stope above the connecting drift between winzes No. 1 and 2 shows a small streak of 570 ore. A wide ledge carrying 2½ ft of 570 ore has been developed in the stope from winze No. 2. The intermediate drift, below the third level and west of winze No. 1, shows a strong body of low grade ore, having lumps from which some \$45 ore is being stopped. The stope near the head of winze No. 2, on the third level, is yielding a quantity of \$75 quartz, and a little \$100 chloride is being taken from winze No. 4. The intermediate stope, between the second and third levels, and nearly above winze No. 1, is producing a small amount of \$200 chloride. A little 570 ore is being stopped from the east drift on the second level. A shipment of bullion, valued at \$5,444.40, was made on the 19th instant, and another of \$8,310.49 on the 23d.

Esmeralda District.

THE SILVER HILL MILL.—*Esmeralda Herald*, Capt. Morgan and Mex. Kilpatrick were in town yesterday, and visited the Silver Hill mill, at Gregory flat, for the purpose of making an estimate of the cost of fixing the mill for active service. Messrs. Ball & Groth propose to lease the mill to work the ore from the Centennial and other mines of this district, if the parties owning the mill will put it in good running order. H. Marden has the mill in charge, and, at his instance, Morgan & Kilpatrick were here to look at it and put in a bid for fixing it. The probability is the mill will be grinding away on Centennial ore in a few weeks.

Mount Cory District.

THE MINES.—*Cor. Bodie Free Press*, April 28: The Mount Cory mine employs but 15 men. They are not putting on any men, and I am credibly informed that it will be several months before they will increase the force at the mine, and I would advise all business and laboring men to steer clear of this camp for several months. There are at present more working and business men in the camp than can make a living. Men are leaving every day. The Mount Cory Co. has in contemplation the erection (at some future time) of reduction works, but no one can tell when or where, though most likely at Hawthorne, or within three or four miles of that place. The ore is very base and refractory. A great deal of the ore has been sent off to be tested at different places, and I suppose, of course, that process which will give the best results will be adopted. The Mount Cory mines are under the able management of Supt. A. G. McKenzie, of Comstock fame. Mac is slow and cautious, but he will be quick enough when he gets everything ready. Col. R. Webster, his efficient foreman, seconds Mac in the prosecution of the work. With Major Higgs as chief assayer, the mine is in good hands.

Safford District.

CHANGED HANDS.—*Eureka Sentinel*, April 28: It is understood that the Odondaga mine, Safford district, has recently passed into the hands of some heavy mining men, among whom J. T. Gilmer and George Hearst are chiefly mentioned. There is hardly any doubt that the mine has been bought by men who can, and will develop it for all it is worth. The Odondaga is probably the best prospect in Safford district, and the chances are it will show up and become a valuable mine. There are a number of other mines that promise well also. A revival of work on the Odondaga will be a good thing for Safford. It will bring life and hope into the camp again. The outlook is very fair in Safford district, and the chances are it will be a booming, prosperous camp before the summer is over.

Tuscarora District.

GRAND PRIZE.—*Times-Review*, April 26: West drift on the hanging wall ledge, 500 level, is in 44 ft; ledge small, and the ore is good. Have raised up 20 ft in it, and it improves in going up.

NAVAJO.—The 550-ft station is progressing very well. It will take three or four days to complete it.

The stopes are producing the usual grade and quantity of ore.

ARGENTIA.—Drift from winze is in 70 ft, and have commenced stoping. Repairing the mill as fast as possible.

ARIZONA.

CLIFTON NOTES.—*Tombstone Republican*, April 26: Bob Holmes, formerly special policeman here, has returned from Clifton, where he went some months ago. He pronounces the mines there as wonderful in extent and richness, and says it would be the best camp in Arizona but for the fact of the class of labor employed and wages paid. Of the 500 or 600 men at work not more than one third are white, the balance being Mexicans and Chinese, who, of course, receive the wages usually paid to those classes. The railroad is graded to the Gila river, distant from Lordsburg about 60 miles, leaving 45 miles to be completed.

RICH STRIKE IN VIZINA.—And now comes the Vizina with a rich strike, made in the lower levels some days since. The rock is manganese, and full of horn silver. Assays average \$900 per ton. The extent of the ore body is not yet developed, but the large amount of black wealth lying in the ore house indicates the strike a big one. The character of the rock is one not hitherto found in the Vizina.

PEACOCK DISTRICT.—*Mohave Miner*, April 22: There are now four men at work on the Infallible mine at Stockton. In blasting out a place to set timbers last week a fine streak of galena ore was discovered. James Mulligan, who has been working on the Crescent mine, in Peacock district, for the past eight or ten months, came in last Tuesday. He gives a glowing account of that mine, and tells us that all the ore taken from the mine has been shipped to the mill at Hackberry, and as soon as it has been milled, that Col. Thornlow, the superintendent of the mine, will resume work on a more extensive scale than heretofore. There are five men at work on Smith & Owens' copper mines near Cedar. It is expected that this fine property will soon change hands. The mill at Grass Springs is running on full time, and the new concentrating tables are doing splendid work and giving entire satisfaction. The work of transforming a 3x5 shaft into the Cupel mine, at Stockton, into a double-compartment shaft is progressing rapidly. There are a great many new prospectors in and about Stockton, and that city of Galena seems to be experiencing quite a boom. Wm. Freeborn came in from Cedar district last Tuesday, where he has been working for several months. He reports everything looking well in that flourishing district, and the miners are preparing to get out lots of ore ready for the 20-stamp mill to be erected on the Sandy. T. J. Christie and James Pemberton have been out to the Primrose mine in Peacock mountains, owned by them, and have brought in some fine samples of the ore for assay. They propose to do considerable work on this mine the coming summer. Erin Sherman is working on the Blue Boy mine, near the Lone Star, and has a big pile of ore on the dump. There is considerable excitement in Aubrey district over the new finds made by Eugene Desty, John Tillman and others, and a great many new claims have been taken up. Henry Ewing is getting ready a car-load of ore from some of his claims of Chloride, to be shipped to the Hubbs smelter at Albuquerque. Work is being vigorously prosecuted on the Keystone, and the mine is being rapidly put into proper shape for working.

PINAL MINES.—*Drill*, April 28: The Lone Will and By Chance mines, owned by W. Clark, have been worked for the last three years by arastra, and have produced ore in sufficient quantity and of a value to amply pay personal and mining expenses. Thirty-five assays taken from ore on the vein have produced an average of \$240 per ton. The ore is free milling ore with a preponderance of horn silver and native silver. Several shafts varying from five to 30 feet in depth, have been sunk. Mr. Clark has unbounded confidence in his mines and for the last three years has never been discouraged.

The News Letter is situated on the Josephine ledge, on which there are so many good locations. Mr. Chas. Brown, the proprietor of Congress Hall, Tucson, is the owner of this valuable mine. Mr. Brown has for years past been engaged in mining in our district and is the owner of some important mining locations. The work on the News Letter is under the charge of Mr. Thomas King. They are working in the main shaft, which is about 100 feet deep. They are about to drift northerly on the vein. They are working in porphyry and quartz. The vein at the bottom is three feet wide, and pay-streak one foot wide. Samples from the latter assay \$400. The ore is of the same character of chloride as is prevalent on the Josephine ledge, and this contains a considerable quantity of native silver.

COLORADO.

JAMESTOWN NOTES.—*Boulder News and Courier*, April 20: The Crocker mill has been running most of the time for several weeks past, and advertises to buy ores that run \$20 per ton or more. Its capacity is 10 tons per day. It has recently been treating ores from the December, Golden Age, Virginia, Mineral Point and other mines. Work is being pushed on the Virginia, and some fine ore from this mine has recently been treated by the Crocker Co. More work is now being done on the mines than ever before, and the results are more satisfactory. While the camp has been very quiet for a few days and business rather dull, we do not know of a single instance where men have invested anything in mines and have worked them but what they are satisfied with the result. Those that do the most grumbling are the ones that have done the least to help the camp. They came here to make a living off the honest laborers and have failed, and to all such chronic grumblers and dead-beats Jimtown is ready and willing to say good-bye. The shaft on the Argo has reached a depth of 62 ft, with ore about the same as has been encountered for 20 ft. The bonanza ledge, owned by the Crocker Co., and situated near the mill, is showing up well at a depth of 15 ft. On Monday the Crocker Co. bought from R. H. Clark 30 pounds of first-class ore that run \$3,447.15 per ton, mostly gold, and 226 pounds of second-class ore that run \$583 per ton. This ore was from the Franklin mine. The additions to and subtractions from the population of the camp about counter-balance each other. About as many are now coming out of the camp as are going in. The Inevitable, an old property that has recently fallen into the hands of Denver parties, is now considered one of the best properties in the camp. The present proprietors be-

gan taking out ore last week, and the first mill run of four sacks made \$218 per ton. Regular shipments of this ore will be made hereafter. An engine was bought this week and will be put up at once. Baker & Hagart are at work with a drill a short distance above the Buckhorn. Their progress is watched with much interest.

IDAHO.

GOLD.—*Idaho World*, April 24: Seventy pounds of analgam have been cleaned from the plates in the Golden Star mill. This analgam is worth \$4 or \$5 per ounce. It is expected the clean-up from the battery will be a big one. Over half of the gold, it is thought, remains in the battery. Sixty or 70 tons of ore have been crushed. The mine still looks splendid. Gold can be seen, without the aid of a glass, in almost every piece of ore picked up. Three men are at work in the stopes daytime and two at night, and are taking out rock faster than the mill can crush it.

MONTANA.

PHILIPSBURG NOTES.—*Cor. New Northwest*, April 24: The Algonquin mill is closed down and in the hands of the Sheriff. Mr. N. Connolly, long considered one of our most substantial merchants, became entangled in the mesh and has gone to the wall. Sheriff, Deputy Sheriff and Constable have been flying around hunting up and attaching everything, from a crowbar to a steam pump, belonging to any of the parties concerned; but, for once in the history of Philipsburg, a few of the workmen were sharp enough not to be caught out. They secured the bullion which was in the mill at the time of the burst up and removed it to some place unknown, where it remained until their money was paid. The Hope mill is still undergoing repairs under the jurisdiction of the old veteran mill man, Capt. Plasted, and will soon be heard thumping away again. Notwithstanding the deep snow and the inclemency of the weather, a good deal of work has been done upon the Granite Mountain. This is to Philipsburg, at present, "the land of promise," and, if it turns out a tenth as good as it prospers, it will do. Mr. Sim Shively reports continued success at the Willow creek quartz mines.

NEW MEXICO.

BULLION.—*Lake Valley Herald*, April 26: The Almbres M. Co. is going along as usual producing their full monthly amount of bullion.

The vein on the Dona Lu mine, at Bullard's peak, is four feet wide, opened 50 ft along the surface. The ore carries silver, copper, lead and iron. In one place a shaft has been sunk 40 ft, striking lead carbonates which assay 163 ounces in silver to the ton.

The Silver King mine is said to be a fine property. The ledge is 40 ft wide; average of ore, eight ounces on the surface. Two shafts are sunk, one on the north, the other on the south end, with 75 tons of ore on the dumps. The Silver Queen is the southern extension and shows mineral of similar description and value.

The Colossal, in the Burro mountains, six miles southwest of Black Hawk, is one of a group of nine mines. The main shaft is down 45 ft, assaying 350 ounces. A large quantity of ore is now on the dump, and work going rapidly forward. On the other claims of the group assessment work has been done. The average assays on the surface are 150 to 200 ounces in silver.

The Silver Bar, No. 2, mine, in the Mogollon mountains, is looking well. The company has on the dumps and in sight a large quantity of low-grade free-milling ore that averages \$20 per ton. The lead is from five to seven feet wide. One tunnel is driven in 176 ft. Next to the footwall of the vein runs a streak of copper-silver ore that averages in silver \$200 per ton. Assays have been made from this streak of mineral running as high as \$1,700 per ton. The President of the company is Chas. E. Slayback, of St. Louis. The company will soon erect reduction works. It is said there is ore enough now in sight to feed a 40-stamp mill for some time to come.

BRADLEY & RISQUE are the owners of a group of eight copper claims on the Middle Gila river, 30 miles from Silver City, from which a good wagon road runs direct to the mines. They are now in course of development.

ANOTHER rich strike has been made in the Bush mine, over beyond the South Percha, at the head of Trujillo creek in Grant county. This time it is at the bottom of a 110-ft shaft, and also in a drift run from the shaft at that depth. The ore is very rich in appearance, and will doubtless run up into the thousands when assayed. An open cut along the vein at the surface has also exposed at the bottom a foot streak of the same ore.

OREGON.

WASHINGTON DISTRICT.—*Cor. Bedrock Democrat*, April 25: The mines look well as far as prospected. Col. Barnes is still at work on the Daniel Boone, with good prospects. He has found some native silver in the ledge, which is two feet wide at a depth of 80 feet.

The Egan mine is 12 feet wide. They have run an open cut some six feet and it still holds its own, showing bromides and chlorides and native silver.

There are plenty of mines to be found in this country yet, as the country has never been prospected thoroughly. Almost every day men come in here and go away again cursing the country. We want men to take hold of our mines that have the money and energy to get up and open them. The prospectors here are all poor men, not able to open the mines as they should be; yet we have done well for the chance we have had. I do not think there has ever been a better field for capitalists on this coast than is presented here. We have silver, copper and iron in immense quantities, and every facility for working the same.

NOTES.—*Jacksonville Times*, April 28: John Barkdell and E. Rothen have commenced work at the big bar of Rogue river.

Brown, Feldt & Co., mining on Aithouse, have been doing well since water became plentiful. They picked up a fine nugget worth \$40 not long since.

Placer mining was a failure in most instances this season. Such dry weather was never experienced before, and the miners sincerely hope it never will be repeated.

The Sterling mine is being worked without interruption, though the ditch is not full as yet. A continuation of the weather of this week will melt the snow remaining in the mountains, when there will be plenty of water.

The Salmon Interest of the Northwest.

One of the great interests of the northwest is the canning of the magnificent salmon which frequent the waters of the Columbia and the other streams emptying into the Pacific. Salmon canning was begun on this coast by the Hume brothers and Andrew Hapgood, all of them having been engaged in salmon canning on the Kennebec river in Maine. They opened their first cannery opposite Sacramento city in March, 1864. In 1866, Wm. Hume, hearing something regarding the salmon prospects of the Columbia river, went up there and found that abundance of fish were being taken at Oak Point, Oregon, by Jotham Reed and his partner, two men from Maine, who had also been engaged in fishing on the Kennebec river, and who had for several years been fishing and salting salmon on the Columbia river. William Hume returned, and from his reports, the company decided to establish a cannery on the Columbia, and in the fall, George W. Hume went there and constructed the works at Eagle Cliff, Washington Territory. In 1867, their first season on the Columbia, the firm packed 4,000 cases of salmon, R. D. Hume and A. S. Hapgood making the cans. From this small beginning the business has advanced until there are now on the Columbia river alone not less than thirty-five canneries which produced in 1882 about 540,000 cases of canned salmon and including the other rivers from the Sacramento to the south of Alaska. On the north the product of canned salmon for 1882 was not far from 1,000,000 cases, with a value of about \$5,000,000.

In Mr. Hittell's "Commerce and Industries of the Pacific Coast" we find the following information concerning the canning interest of the Columbia: The salmon fishery of the Columbia gives employment in the season to 5,600 men, 3,100 Chinamen being employed in the canneries, while 2,500 whites take charge of the boats and nets. The cannery proprietors own 1,200 boats, and lease them with nets and all the necessary tools and supplies to the fishermen, a large proportion of whom are Scandinavians, Italians and Finns, who, as rent, must give one third of the catch, and must sell the other two thirds at a stipulated price. Each boat has two men, a captain and a helper. The former hires the latter, boards him, and gives him ten cents for every fish caught. The fishermen who own their boats and nets sell where they please, but usually receive the same price as is paid to the men using the cannery boats. It is expected that the captain of a boat will make at least \$100, and his helper \$70 a month for their labor. The average catch of a boat for a season may be 2,000 fish, worth \$1,200, equivalent to \$300 a month, of which \$100 is allowed for the use of the boat and net and other material. The price on the Columbia was sixty or sixty-two and a half cents a fish in 1881, the price having increased gradually since 1866 (and is still increasing.) In the canneries about 850 white men are employed as superintendents, clerks, foremen, etc., earning from \$50 to \$175 a month, averaging \$62. White men make the nets, cans, boats and cases, and have all the capital used in the business. The 3,100 Chinamen receive \$372,000 for their work of four months; the 850 white laborers in the canneries receive \$210,000; the 2,500 fishermen, \$850,000. The wages in the fishing season, and cost of fish paid by the canneries amount to \$1,433,000; and of this the 4,000 Chinamen get less than a third, while the 3,500 whites divide the other two thirds among themselves. The proprietors get \$2,750,000 for the product, leaving them \$1,316,400 above the cost of the fish and wages in the fishing season to pay other cannery expenses, interest on the investment and profits.

ENGINES FOR ELECTRIC LIGHTING.—Some idea of the progress which is being made in electric lighting may be formed from the following item: A. F. Upton, Boston, agent for the Armstrong & Sims engine, has received orders for twelve fifty-horse power engines of the Armstrong & Sims pattern, to be used for running electric lights in different places.

LIME FORMATION.—The hitherto much despised formation is now becoming all the rage with prospectors, and everybody is looking for rich deposits of metal in places where a few months ago they would have been ashamed to be found drunk. Thus does each section have peculiarities, and thus it is proved that mineral

change of sentiment will undoubtedly lead to many rich discoveries in all sections of the range, and while it cannot detract from the value of the many rich properties which are already known to exist on contacts of granite or porphyry, it can by directing attention in a new direction make the country more valuable.

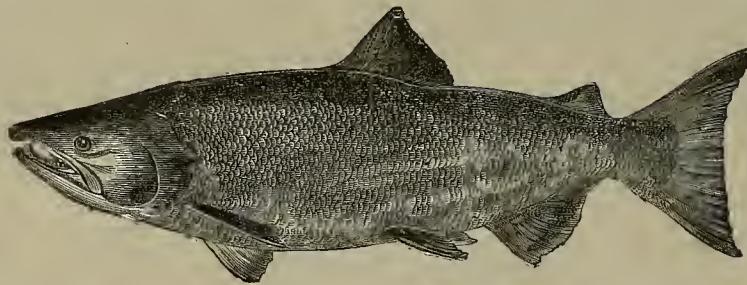


Fig. 1.—THE MALE SALMON.

is where you find it and not entirely where theorists say it should be. In the Black range everywhere the bonanzas seem to be under a black lime capping, and in gash veins cutting through solid lime formation. The reason why these discoveries have not been made before is because most of the prospecting to date has been done on contacts of granite and porphyry,

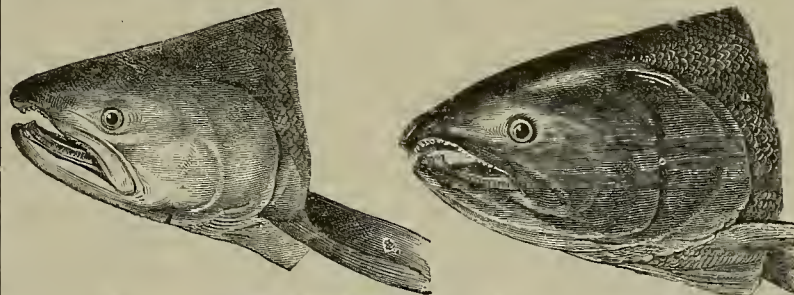
DOES MINING PAY?—This is a conundrum that is being asked by half the papers of the Union. Does mining pay? Ask the thousands of men, who two years ago did not know what a bean was and who now feast upon beans three times every day of their lives. Ask them whether or not mining pays. Ask the other thousands of men, who two years ago, had



SALMON FISHING STATION ON THE COLUMBIA RIVER.

and lime has been abhorred and shunned. Lake valley and the Perchas were contradictions which puzzled the scientific and theoretical prospector and set him thinking, and the Polo-

never seen such a thing as a pair of canvas pants and who now wear canvas pants not only on Sundays, but every day of their lives—ask them whether or not mining pays. When you



Figs. 2 and 3.—MALE HEADS DURING THE SPAWNING SEASON.

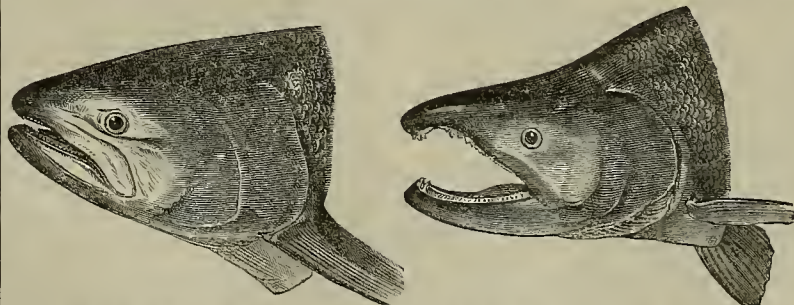


Fig. 4.—FEMALE HEAD.

Fig. 5.—HUMPBACKED SALMON.

mas discoveries only were needed to revolutionize his ideas and set him to looking for his fortune in new quarters, until now it has come to pass that he will hardly glance at the ground to keep from stumbling when compelled to pass through a granite or porphyry region. This

go to head (and tail) quarters and ask for information as to the paying proclivities of mining as a business proposition, you get your answer in thunder tones from every cabin on the mountain side in which the bean pot is boiling and the slap-jack pan is sizzling, "It does!"

The Salmon.

The engravings given herewith well illustrate the salmon. Fig. 1 is a faithful representation of the male salmon in his normal condition as he comes in fat from the sea. He is then in his prime. The curve of the lip is a plain indication of the sex. When he strikes fresh water his taste for food leaves him and, eating nothing, he becomes thinner and thinner. The appearance of the head of the female is like that shown in Fig. 4, when the mouth is well shaped and the nose round and full. As the male fish proceeds up river his nose becomes hooked as shown in Fig. 2; and, later on, it gets even more hooked as Fig. 3 illustrates. There are several theories as to the cause of this gradual hooking of the nose. It used to be thought due to the increase of fighting propensities when the fish come into fresh water. That nature provided the hook nose then as a sort of weapon. Others thought it was to dig a sort of hole or hollow in the river bed where spawn might be deposited. Now, it is supposed to be used for breaking the tissues that hold the spawn in the female so that the spawn may be released and pass out. The fish is supposed to push against the female with the nose so as to break the tissue as stated.

Whatever the reasons, all male salmon, salmon trout, etc., get the hook nose. The nearer to the milting season the more pronounced the hook. When the fish return to the sea the nose again becomes rounded and the head assumes its normal shape.

Fig. 5 shows the head of a hump-backed salmon. In this, the hook nose is a very prominent feature, so much so that many believe it is the same species as the *Quinnat*, which we have just described, and that the fish assumes this shape, and returns to the shape shown in Fig. 1 after the spawning time. However, it is now conceded, we believe, that this is a distinct species. He has a very hooked nose and a regular rounded hump-back, being a homely fish, and not at all like the *Salmo Quinnat*, which is the variety we eat. The hump-back is found all along the coast up as far as Sitka, but is not very common.

Fig. 6 shows the appearance of one of the fishing stations along the river. Here are means for spreading and mending the nets, with houses for the fishermen.

What is called the fishing wheel is one of the innovations in the business, and is designed to supersede the fisherman. A large wheel is put up at one side of the river in a place where the fish run, and it is revolved by the current. There are scoops arranged, which catch the struggling fish as they try to go by, and these scoops throw the fish out where they are taken. These wheels catch the fish by thousands, much faster than the fishermen can do it. There is outcry against them, however, as it is said their use will deplete the supply of salmon.

A SIGNAL STATION AT MOUNT WHITNEY.—The Government has determined to establish a Signal Service station on the summit of Mount Whitney, and during the coming summer a detail from the engineer corps at the Presidio will be sent thither to make the necessary survey for that purpose. Mount Whitney is supposed to be the highest peak in the United States, having an altitude of 14,898 feet above the sea level. It is described as "the culmination point of an immense pile of granite, which is cut almost to the center by numerous steep, and often vertical canyons." It is situated on the west border of Inyo county, Cal., near the center of the Sierra Nevada, and about 325 miles southeast of San Francisco. The station will have an elevation more than double that of the station on Mount Washington, New Hampshire. At the latter station the winter gales attain a speed of 100 miles per hour. As the data on which storm predictions for this coast are obtained from stations north of San Francisco, that on Mount Whitney will not be as useful to this coast as the Mount Washington station is to the eastern seaboard. It will, however, serve for many important scientific purposes. The signal station at Point Barrow, the most northerly extremity of the western coast of North America, latitude 71° 24' N., is to be abandoned, and a vessel will be sent up next month to remove the party stationed there. There the winds in winter blow with a speed of over 100 miles per hour, and the mercury sinks below 50° below zero.

THE ENGINEER.

SCREW IN TUNNEL. The Lightning, one of the earliest torpedo boats supplied by Messrs. Thornycroft to the British service, has been lately subjected to a series of progressive speed trials at Portsmouth, under the superintendence of Chief Engineer Castle, of the Steam Reserve. The steering power of the craft, which is otherwise satisfactory, proved defective in consequence of the wide circle which she required to turn in. In order to surmount the difficulty the propeller has recently been encased in a tunnel; but while it was thought that the device might improve her handiness in going round, it was feared that it might detract from her speed. Trials were accordingly ordered to be made upon the measured mile in Stokes bay, for the purpose of comparison with the speed which she realized with the original propeller. Four runs were made at full speed, fourteen knots, twelve knots, and ten knots. When tested to the utmost, a mean speed of sixteen and one half knots was obtained, or about half a knot less than under the old conditions. The horse power developed, however, was also less, and as this is supposed to be due partly to the inferior character of the coal used, and partly to the fuel being forced over the bridge and so choking some of the boiler tubes, it is probable that further runs will be ordered. The steering in circling and going ahead was better than before, but in steering with the engine going astern the results were less satisfactory than with an open screw.

AMERICAN ENGINEERING. The story is told that, twenty years ago, one of our New England railroad companies did not dare to adopt the plans of its chief engineer for an iron bridge until they had been sent over to England and approved by experts there. Last year one of the leading English engineers designed a bridge in which there were two spans of 1,700 feet each, or 100 feet more than that of the East River bridge. This design has been most severely attacked by the Astronomer Royal, and a good deal of capital made out of it. The engineer, Mr. Baker, in replying to it says: "As a sample of foreign opinion, I would quote that of Mr. T. C. Clarke, the eminent American engineer and contractor, who has built more big bridges himself than are to be found in the whole of this country, and who has just completed a viaduct of 301 feet in height, by far the tallest in the world. Referring to the proposed bridge, he writes: 'If my opinion is of any value, I wish to say that a more thoroughly practical and well considered design I have never seen.' I need hardly say that the opinion of such a man has far more weight than that of an army of amateurs." This, as the *Railroad Gazette* says, is a very gratifying evidence that American engineering is growing in its reputation abroad.

THE HUDSON RIVER TUNNEL.—Work upon the New York side of this tunnel, which was suspended about six months since, has now been resumed. The water was pumped from the excavation, and it was found that the brick walls of the tunnel were not injured in the least. One of the engineers engaged in the work says: "We are making very satisfactory progress. Since the work was suspended the river bed at the outer end of the tunnel has become more solid. After we get about thirty feet farther we shall strike a loamy soil similar to that through which the tunnel on the other side of the river has been dug, and will be able to push the work much faster. We are now making progress at the rate of about two or three feet a day." The tunnels on the New Jersey side of the river have been kept free of water as far out as the air-lock in each tunnel. Work was also suspended at about the same time on the Jersey side, where it has not yet been resumed, but will soon be after Mr. Chas. G. Francklyn, the President of the company, returns from Europe.

THE TEJACATEPEC SHIP-RAILWAY.—Capt. James B. Eads has resigned his position in the Government River Commission, to devote his attention exclusively to his ship-railway project. It appears that complete arrangements have been made in England for the necessary capital to complete the work, and inside of five years the railway will be carrying ships weighing, with their cargoes, 5,000 gross tons from the Gulf to the Pacific and from the Pacific to the Gulf. The construction of this railway will shorten the distance between New Orleans and San Francisco by fully 2,200 miles—making a saving of 4,400 miles on the round trip.

THE PANAMA CANAL.—Unless Mr. Charles Lesseps, who has just been interviewed in New York, presents an unwarrantably rose-colored view of the situation, work on the Panama canal has been pushed forward with an energy and success of which the American public generally has but an inadequate idea. M. De Lesseps reports that the work is less difficult than had been expected, and he professes to be hopeful of its completion in five years' time. No less surprising is his statement that the company is in no want of funds.

THE CANADIAN PACIFIC RAILROAD is still progressing westward at a very rapid rate. On the 24th of April, two miles of track were laid, making 597 miles of continuing track westward from Lake Winnipeg.

USEFUL INFORMATION.

Cleaning Watches with Benzine.

A correspondent of the *Watchmaker and Metalworker* tells how he cleans watches with benzine. The method may be useful for other fine work. He says: I immerse the parts in benzine and dry in boxwood sawdust. This gives the gilding a fresh, new look which I have never been able to get by any other process. The movement must be entirely taken down. The dial screws may be screwed down tightly and left, but all parts mated with screws must be separated, so that there will be no places where the benzine can remain and not be at once absorbed by the sawdust.

I have a large alcohol cup, which I fill about half full of benzine, taking down my movement and putting the larger pieces in the fluid. The scape wheel, balance, and delicate parts I treat separately, that they may not be injured by contact with the heavier pieces. I then take the pieces one at a time, and tumble them into the sawdust. In a few seconds they will be dry, when I pick them out and lay them in a tray, using brass tweezers, which do not scratch. I treat all the parts in this way except the mainspring, when a slight use of the brush and clean chamois will remove all dust. Of course, the holes must be cleaned with a pointed peg, and I wipe out the oil sinks with chamois over the end of a blunt peg, but it is not often necessary to clean the pinions with a peg; they will come out of the sawdust bright and clean.

The mainspring must not be put into benzine unless you want it to break soon after. The fluid seems to remove the fine oily surface which a spring gets after working for a time, and which is very desirable to retain; so I clean my springs by wiping with soft tissue paper. If they are gummy I put on a little fresh oil to soften, and wipe off, being careful not to straighten out the spring.

SOLIDIFIED MILK, OIL, WHISKY, ETC.—In the market of Jokutok, the Siberian town, whose name has become so familiar to American readers through the story of the ill-fated *Jeanette*, it is said milk is sold by the block—frozen. Each block has a string or stick frozen into it for convenience in carrying.

We have already in these columns made mention of the solidification of oil, and now, in addition to these two substances, it is said that some ingenious chemist has succeeded in solidifying whisky, so that it may be carried about in casks in the waistcoat pocket and resorted to at any hour of the day or night. He must be a very ingenious fellow indeed, who has done anything one half so clever. In this country, at least, the essential element of whisky is alcohol, and alcohol has never been solidified. Even under the greatest pressure it only becomes a viscous fluid. From all that we have ever heard of American whisky, however, we think it very likely that its composition is so peculiar as to make its solidification quite possible, but the man who would carry it about in his waistcoat pocket, must indeed be an ardent opponent of total abstinence.

WHITE BRONZE.—Experiments are being made, according to the *Polytechnische Notizblatt*, in Paris with a new alloy having a white color yet containing no nickel. It is said to be very strong and malleable. It is made of copper and ferro-manganese, the proportions being varied according to the purpose to which the alloy is to be employed. An alloy of forty parts of copper and sixty parts of ferro-manganese, with a suitable quantity of some appropriate flux, produces a metal of such tenacity that it surpasses the best steel armor plates. The melted mixture is cast in blocks and is perfectly malleable. To obtain a white metal that can be rolled out in sheets, the above alloy is melted again, and twenty or twenty-five per cent of zinc or white metal added, which imparts to it the desired quality. A plate of the first named alloy two inches thick was found by experiment to offer more resistance to a cannon ball than a steel armor plate of the same thickness. This new kind of "white bronze" is not to be confounded with the alloy used in this country under the same name for grave-stones and monuments, and which consists principally of zinc.

POST OFFICE FRAUDS.—The U. S. *Official Postal Guide* publishes a list of over 500 names of persons designated as frauds, and who conduct fraudulent lotteries and enter into other schemes to defraud the public, and to whom payment of money orders and the delivery of registered letters has been prohibited by the Postmaster-General. Of this large number, there is not one shown to reside in California, or any of the Pacific coast States or Territories.

CUCUMBER WOOD.—There is a kind of timber known as "cucumber wood" which is used in some parts of Ohio for siding, and is regarded as good as any wood for that purpose. Considerable quantities of cucumber are cut on the Mississippi bottoms, where it is cut into dimensions and made into boxes.

SHRINKAGE in lumber varies according to the tree from which it is made. Oaks will shrink in drying a half inch to the foot, while the redwoods of California show no perceptible change, and the heavy eastern or South American woods lose but little.

A LUMINOUS SLATE.—One of the most charming adaptations of Balmain's luminous paint is a magic slate, supplied by Messrs. Wolf & Son, which can be written upon in the dark with an ordinary leadpencil. The writing or drawing appears as so many lines of darkness surrounded by a background of light. Under many circumstances such a slate may be found very useful, but it cannot fail to be a source of much amusement. No phosphorus or other inflammable material is employed in the manufacture of the slate, its luminous properties being derived solely from its power of giving out light absorbed during the day. The writing or drawing on the slate can be easily removed by a moist rag or sponge, and the slate itself cannot be worn out, its luminous powers being re-excited by exposure to light from day to day. As a writing-tablet for desk or office the luminous slate may also be used, resembling, as it does, in color and form, the ordinary porcelain slate.

THE UTILIZATION OF SMOKE.—A company at Elk Rapids, Mich., which manufactures fifty tons of charcoal iron a day, formerly allowed the smoke made in burning the coal to go to waste. Now the smoke, as it is formed, is delivered into stills charged with lime and surrounded by cold water, the result of the condensation being first, acetate of lime; second, alcohol; third, tar; the fourth part produces gas, which is consumed under the boilers. A thousand cords of wood are converted into charcoal daily, yielding 2,800,000 cubic feet of smoke, from which are obtained 12,000 pounds of acetate of lime, 200 gallons of alcohol, and twenty-five pounds of tar. The alcohol has been contracted to a firm in Buffalo, N. Y., the *Trade Review* says, for five years, they furnishing the packages and receiving it at the works at eighty cents per gallon.

HOUSE MOVED BY A TREE.—A large elm tree at Norwich, Conn., has moved a house by the force of its growth. The tree is more than seventy years old, and the trunk reaches a height of thirty feet before a limb branches out. During the March winds the limbs spreading over the house swept off part of the chimney, and it was removed. The tree, which stands at the northeast corner of the house, has grown so large that it raised and moved the house one foot from its original position.

A COUNTRY WITHOUT HOUSE-FLIES.—Housekeepers will be interested to learn that there is one country in the world where the common house-fly is almost unknown. That is the Philippine Islands, and the phenomenon is explained by a writer in *Science*, who says the fly could not, by itself, traverse the 600 miles of windy ocean lying between the islands and the mainland, while the few flies that arrive at Manila in vessels fall victims to voracious insect enemies.

GOOD HEALTH.

Variations of Digestion.

Of course it is impossible to reduce digestion to a positive science in its relations to different persons, the time varying according to diverse circumstances. After a fast of several hours, when the appetite is keen and the powers are in their best conditions, active and fresh, it is reasonable to infer that a meal will be digested in very much less time than when these powers are debilitated by excessive labor, fatigue and depression. Like the body, as a whole, the stomach may be active, energetic, and prompt in its labors. For the same reasons, the digestion of one accustomed to vigorous labor in the air and sun, with an unusual amount of the waste of the tissues as the result of such labor, will be far superior to that of one of sedentary habits, and the indolent, with little waste and with far less demand for the repairs of a wasted body. While both do not demand the same food in kind and amount, it is evident that the time of digestion will vary. It is proper to add that neither violent exercise nor absolute indolence are favorable to digestion, but moderate exercise. It is also true that digestion is impaired and retarded by violent mental labor, by grief, anxiety, anger, all violent emotions, such as divert the blood from the stomach to the brain, robbing digestion of its vital forces. Even sadness and discouragements impair the digestive processes, while cheerfulness, hope, and buoyancy of spirits produce the opposite results. "Laugh and grow fat."

Of course, digestion in the young and vigorous, the growing child, demanding food for daily use for repairs, in addition to that needed for growth, must not only be active and prompt, but such will demand more food relatively than the adult. The same is true of one emaciated by disease, since there is a greater demand for the repairs of the wasted tissues; and yet there is a limit.

It is possible to exceed the amount demanded in such cases, by which excess the stomach may be so far taxed as not to be able to digest enough to meet the real wants of the body, or it may do this labor so imperfectly as measurably to defeat the design of eating, that of giving health and strength. Even the "growing boy" may eat so much as to weaken the digestive powers to that extent that only a small part of the food taken will be of any value. The food fairly and thoroughly digested only can be of much service, while that undigested, remaining in the stomach to ferment and decay, not only is of no

service, but must contaminate the body, inducing disease. It is quite certain that most of the lassitude, the feeling of fatigue in the morning, is attributable to the absence of rest and sleep occasioned by a late meal, taken at bedtime, it may be, or to a too full meal at the usual time, by which the organs of digestion are so taxed, overworked, as to produce this general feeling of fatigue. These organs may as certainly suffer from labor, toil, as the body as a whole, resulting in a general fatigue, an unrefreshed state of the whole body. Dr. J. H. Hanford.

THE EYE.—If one would have clear and good sight, keep the stomach in a good condition, by the use of simple, nourishing and easily digested food, taken at proper times, and never rob the eye of its great food-stimulus—the light of the sun. Seeing is as natural as breathing, when no obstacles are presented. We breathe without effort naturally, but if the chest is bound and constrained, it is difficult. So with the sight. We have simply to open the eye and it sees naturally and without effort, under favorable circumstances. I know of no better eye-water than pure, soft water, bound with a wet cloth over the eyes, if inflamed or painful. I know of no better medicine than the light of the sun, not so bright and dazzling as to be painful. Even in sickness, with some modifications, a reasonable amount of clear sunlight is an advantage, at least in the room, the eye being covered by a wet cloth, if painful. If we would have good sight, away with stained glass, dark curtains, veils, shades, blinds, "banged hair," or all hair through which one attempts to see. Do not attempt to read, study or work when the light is not a good one, always preferring natural light to artificial, doing as little work at night as possible. Do not use a flickering light or read in the cars to save time. Do not use the eyes at the twilight hour, or under any circumstances particularly trying. Open the eyes and let them see, instead of compelling them to see.—Dr. J. H. Hanford.

RIGHT LIVING.—It is preposterous to suppose that we can live as our sensual impulses may dictate, outrage all common sense, violate all of the laws of our being, and then escape the penalty. We cannot live like swine and rise to the position of angels. Disease is no accident, but has causes as certainly as have bruises, sprains, broken bones, and the like. Derangements, disease, pain, suffering, and premature death are the direct outcome—the results—of the violations of the laws of the body, or the laws of God, in general, visited upon us as penal inflictions. There is no accident or uncertainty in the matter of securing health by obedience to the laws and conditions of health. There is no more uncertainty in securing it than there is in obtaining an education, in learning a trade, or in succeeding in any branch of business. Seeking health is a legitimate business, and is far more promising and certain than the mercantile, since there is no danger from competition, and very few obstacles in the way, save our own sensual weaknesses. As a general principle, the climate is far more favorable than our own habits. We can obey and succeed, or disobey and suffer. In this we are free to act, and are the architects of our physical fortunes, as much as in business.—Dr. J. H. Hanford.

MULLEIN AS A REMEDY FOR COUGHS.—Dr. Quinlan, of Dublin, who last year read a paper at the British Pharmaceutical Conference on the homoeopathic properties of the *Plantago lanceolata*, has recently investigated the properties of the common mullein, *Verbascum thapsus* (*British Medical Journal*, January 27, p. 149). This plant has long been used in Ireland as a domestic remedy for consumptive cough, and Dr. Quinlan has made a series of experiments with a view to determine if it really possesses the valuable properties attributed to it. He finds that when boiled in milk the patient takes the decoction readily, and experiences a physiological want when it is omitted. Its power of checking phthisical looseness of the bowels and the relief afforded to coughing were very marked, so that the patient took hardly any other cough mixture. In early stages it appears to have a distinct power of increasing weight, but in advanced cases Dr. Quinlan remarks that he is not aware of anything that will do this except koumiss.

SNEEZED SIX DAYS.—The Ithaca (N. Y.) *Journal*, of a recent date, says that Mrs. Harrison Thayer, who lives on Jersey Hill, in the town of Danby, began sneezing Tuesday. After eight hours' continued sneezing the family became alarmed and called a physician, who could not account for the strange attack and could only ease the lady by administering chloroform. But this only effected a temporary cure, for no sooner does Mrs. Thayer become conscious than she begins sneezing again. On Monday she was still at it. A second physician was called in, and both say they never knew such a case before.

BEWARE.—The *Sanitary Engineer* gives this valuable piece of advice to housekeepers: Beware of disused "conveniences," and don't trust to the memory of any one for filling the visible trap with water. Better remove the whole fixture and seal up its outlet if not wanted for frequent use. Moreover, don't you put such an antiquated device as a pan-closet in a first-class house anywhere. Even if its receiver be ventilated, the vent-pipe may work the wrong way and deceive you.



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SAN FRANCISCO:

Saturday Morning, May 5, 1883

TABLE OF CONTENTS.

EDITORIALS.—Swedish Blast Furnace; Pacific Coast Mining Exposition; Machine Mining Drills, 305. The Salmon Interest of the Northwest; The Salmon, 30. Passing Events; Catching Float Gold in Streams; Mining and Metallurgical Appliances; Copper Mining on the Pacific Coast, 312. The Brooklyn Bridge, 313. Patents and Inventions; Notices of Recent Patents, 36.

ILLUSTRATIONS.—Shaft Sinking and Drifting with Machine Drills; Plan of Swedish Furnace; Swedish Furnace for Copper; Starting a Tunnel, 305. Group of Salmon; Salmon Fishing Station on the Columbia River, 310. View of the New York and Brooklyn Bridge, 313.

MECHANICAL PROGRESS.—Sources of Injury to Boilers; A New Style Locomotive; Power of Belting; How to Select a File; What Next; The Effects of Punching on Metals; Cold and Hot-Short Iron, 307.

SCIENTIFIC PROGRESS.—The Storage of Electricity; The Great Red Spot on Jupiter; The Electro-microscope; Photomicrography, 307.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends and Ballot Shipments, 308.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico and Utah, 308-9.

THE ENGINEER.—Screw in Tunnel; American Engineering; The Hudson River Tunnel; The Tehuantepec Ship-Railway; The Panama Canal, 311.

USEFUL INFORMATION.—Cleaning Watches with Benzine; Solidified Milk, Oil, Whiskey, etc.; White Bronze; Post Office Frauds; Cucumber Wood; A Luminous Slate; The Utilization of Smoke; House Moved by a Tree; A Country Without House Flies, 31.

GOOD HEALTH.—Variations of Digestion; The Eye; Right Living; Mullein as a Remedy for Coughs; Sneezed Six Days; Beware, 311.

NEWS IN BRIEF.—On page 316 and other pages.

MISCELLANEOUS.—English Investments in the Pacific Coast Mines—No 3; The Immigration Association of California; Southern Nevada, 303.

BUSINESS ANNOUNCEMENTS.

Reliance Machine Works—Clot & Meese, S. F.
Elevator Works—Philip Hinkle & Co., S. F.
Chemical Sawnware—Richard C. Remmey, Philadelphia.
Hydraulic Giant—Hoskin Bros., Marysville, Cal.
Sackett School—D. P. Sackett, Oakland, Cal.

Passing Events.

The news from the mining regions seems everywhere favorable just now. From various places come notices of new strikes. Down in the southern part of this State a new camp has been opened. Up in Idaho new coal fields have been found near Horseshoe Bend. Encouraging reports from Clark's fork and Emigrant gulch, Montana, are received. A "stampede" from Montana into Washington Territory is now going on, new mines having been discovered there. They are gold diggings of which but little is so far known. In this State people are now expecting a very prosperous year, both the mining and agricultural community being satisfied with the prospects.

NEW MINES.—A new mining district, called Poorman's, at Mesquite, on the Colorado desert, this county, has been located within the last two weeks. The mines are situated one mile in an easterly direction from Douglas Peak, and half a mile southwesterly from Flag Staff Peak. The Southern Pacific passes within a short distance. Following are the names of the mines that have been located, the assays from which are reported to be enormously rich: City of Chicago, Esperanza, True Fissure, Outside, Los Amigos, Kate West, Ocotilla, Buffam, City of New York, Crescent City, Mand and Maggie, Great Expectation, Kersage, Sand Storm, and Nameless.—*San Diego Sun.*

THE North San Juan Times says that North Bloomfield, a hydraulic camp, is one of the liveliest places in Nevada county and a reminder of the early mining days.

Catching Float Gold in Streams.

We often hear mining men tell of the large quantities of float gold which pass down the streams of this State where mining is carried on, or which receive the waters of other streams where men are mining. No one seems to have thought it possible to catch any of this float gold after it passed out of the sluices into the streams themselves. Yet in other countries the people avail themselves of the opportunity afforded on streams where mining is done to catch the float gold—for it really does exist. It has been found, for instance at Charleston, New Zealand, that the gold does not all settle in the tail races, but that, in the union of the water of several tail races, a small percentage, well worth saving, floats away.

The gold is arrested by a method termed "fly-catching," which consists of a series of blanket-tables placed across stream, like weirs, so that the waters shall flow over each table in succession. The tables are washed in turn, and the gold is streamed from the sand and caught up by quicksilver. Many of these "claims" yield from \$20 to \$45 per week, with little labor. In the Charleston district referred to, fly-catching has become quite an industry in itself, and no doubt there are quite a number of places in this State where similar stations could be maintained with profit.

The tables are constructed entirely of timber. Piles two or three feet in length are driven firmly into the bed of the creek and on these are nailed lengths of stout quartering, covered over with one inch-boards laid close together, so as to form a smooth table. Pieces of lighter quartering are then placed over the boards from top to bottom, forming divisions about four feet in width. Blanketing or cloth—ordinary grain sacks opened out—are frequently used—is next spread smoothly along these divisions and securely fastened down by small strips of wood. The tables vary in length from seven to twelve feet, and are placed in the creek at intervals of from sixty to 100 feet, extending quite across the stream. The proprietors of these rights are said to realize during rainy weather very good returns, ranging from \$10 to \$30 a week, according to the nature of the workings on the banks above and the number of tables set in the creek. The tables are liable to damage by flood. The tables are made in compartments and when the blankets are lifted out of one compartment, spare cloths are kept to replace those lifted. The men wash out the cloths once or twice a day, in a box by the side of the creek. The fine tailings pass over several sets of tables in their course down the creek.

Shoes and Dies for Amalgamating Pans.

As ordinarily constructed amalgamating pans receive the pulp and tailings from the battery, and are provided with dies on the bottom of the pans and shoes which are fixed to a revolving miller, so as to be moved over the dies and in close contact with them, while the pulp is caused to pass between these moving surfaces, where it is ground in the presence of quicksilver, so that the latter may amalgamate with any particles of gold or silver, and take up any quicksilver or amalgam escaping from the battery or other previous apparatus. These iron shoes and dies are subjected to considerable wear by the sharp sand passing between them, and more or less iron is taken up with the amalgam, which is thus rendered base; and it is difficult to separate the gold and silver contained in it. The iron has, of course, no particular affinity for the particles of gold, silver or amalgam, and is of no assistance in arresting them. A new idea in amalgamating pans has just been patented through the MINING and SCIENTIFIC PRESS Patent agency, by Johnson & Osborn, of Dos Cabezas, Arizona. They propose as a new article of manufacture shoes and dies for amalgamating pans, formed of silver. The silver amalgamates readily and presents a surface having a strong affinity for any particles of gold, silver or mercury, and will arrest the latter even when in its most difficult condition to save—when it is finely divided or "floured."

In some cases the shoes are in the form of rollers which rotate as they pass over the dies, and the pulp is caused to pass between the surfaces of the rollers and the die, the great affinity of the amalgamated silver causing it to take up the passing valuable particles with great avid-

ity. In this case the inventors think there is little need of the scouring or grinding action of flat shoes and dies. These shoes and dies may be used in what are known as "continuous pans" in which the pulp is fed in at the center and is discharged continuously at the periphery of the pan. These silver shoes and dies add to the amount of silver by their wear, so absolutely nothing is lost, and there is no additional expense created to separate out base bullion afterwards. Of course, these inventors know that copper or silver plates have been used in amalgamating pans where there was no considerable amount of grinding necessary, but only such friction as will brighten the particles and enable them to adhere to the silvered surface. The silver shoes and dies, however, are new articles of manufacture.

Mining and Metallurgical Appliances.

In some respects the newer mining regions of this coast have an advantage over the older, aside from the fact of having new mines to work. They have the experience of others as a guide and are not compelled to experiment so much. For instance, when new mines are found and it is contemplated to erect reduction works, there is not any necessity of experimenting with half a dozen processes. Metallurgists well know how the same kind of ore was worked elsewhere, and the experiment of the older camp need not be repeated.

Of late years, moreover, the mechanical appliances of mining have been very thoroughly perfected as long experience has dictated. There is now no danger of getting mills which are rattle-traps—provided reliable foundrymen are the makers—or furnaces which are mere stoves.

First-class metallurgical plants are now fitted out ready for use by the foundrymen making a specialty of this kind of work. For copper and lead, excellent furnaces, admirably adapted to their work, and with all improved attachments, are furnished ready to be set at work immediately. The old-fashioned masonry and heavy fittings are dispensed with, and water jackets, improved tuyeres, blowers, etc., make the modern style far ahead of what was known a few years ago. Copper and galena mines profit by this greatly, and first cost of plant is largely reduced.

Pans and settlers have become simplified, and instead of two or three dozen kinds, a combination of the best points of the best has been effected, so that there are now no longer experiments in that direction to be undergone with every new mill. With batteries and mortars, we have settled down to a type which has stood the test of experience of years, and all make the same style, with but few modifications. The number of concentrators has not increased, but has decreased. That is, a few styles having proved successful, economical, and good, have been adopted, and dozens of experimental machines so much heard of a few years ago have disappeared. Amalgamating appliances have been invented and patented in great numbers, though comparatively few have been applied in practice. In most of the best mills the same thing in this case will be seen.

Of the many different styles of roasting furnaces but few have stood the test of actual experience, and these few have been improved gradually to great efficiency. In the matter of leaching, practice differs more or less with the classes of ore, but the best metallurgists agree pretty well on the main points. Hoisting engines of different types are used, but the same general principles govern the construction of all. In pumping appliances there is perhaps more range than in any other thing connected with mining. Yet for deep mining work only certain styles of pumps are used. The only innovation is that of pumping by hydraulic power, as carried on now on a large scale at the Comstock and at Eureka, Nevada, and quite successfully. This system will gradually spread, no doubt, and other mining camps will have hydraulic pumps.

In the matter of rock drills and compressors, there is a great variety, though three or four styles seem to keep their places, as they do good and efficient work and have stood the test of every day experience.

People used to spend a great deal of money experimenting with new appliances and processes, in hopes of getting something better than their neighbors. A new mining company, with new men as managers, was very apt to do this. Now, however, it has been found to be best to be careful in this respect. New companies are now more apt to get the very best appliances of all kinds combining the experience of all who have gone before.

Copper Mining on the Pacific Coast.

The Business in California.

For a number of years following the collapse of the Copperopolis mines the business of prospecting for and mining copper ore was much neglected in California. What little ore was extracted during the twelve or fifteen years that followed the abandonment of the Copperopolis mines was nearly all shipped out of the State, scarcely any attempts having been made at working it here. That the business received so little attention during this long period was owing to the great decline that took place in the price of this metal at the close of the war and the difficulty that has attended the reduction of the California copper ores, which are not usually of high grade, while they are largely of the sulphureted variety, rendering them troublesome to treat. The cupriferous ores occur in a great many places in this State, the deposits being very numerous along the foothills of the Sierra Nevada. In Del Norte county several large veins have been discovered and worked to a limited extent, the ores there being extremely rich.

Beneficiating the Low Grade Ores at Spenceville

Notwithstanding the drawbacks mentioned, it may be expected that this industry will be gradually revived in California, the method of treating these low grade sulphureted ores adopted by the San Francisco Copper Mining Company, having demonstrated that they can be reduced with profit. The mine and works of this company are situated at Spenceville, Nevada county. Their ore is abundant but assays only from four to ten per cent metal and is nearly all of the sulphureted variety. Not until ten or twelve years had been spent here in futile efforts, was a method hit upon by which this ore could be successfully handled. This accomplished, the business of beneficiating it has been prosecuted for the past five or six years on a large scale and with satisfactory and steadily increasing profits.

The leaching plan adopted by the San Francisco company, long used in Germany and Spain, may be briefly described as follows: The ore is first roasted by being placed in great piles on layers of wood, these piles containing usually as much as 1,000 or 1,200 tons each. The wood once fired, combustion is kept up by the burning of the sulphur in the ore until the latter becomes practically desulphureted. This roasting process proceeds slowly, from four to six months being required for its completion. The sulphate produced by roasting is placed in wooden tanks and leached. The solution thus obtained, after being transferred to reservoirs and settled, is pumped into revolving cylinders, where the copper is precipitated through the agency of scrap iron. Two or three tons of the precipitations having accumulated in each cylinder, they are removed, filtered, and transferred to the drying pan, which, expelling the moisture, leaves the product in the form known as precipitate, or cement copper, which, assaying between eighty-five and ninety per cent fine, is in shape for market. By the above process, from forty to fifty per cent of the metal is extracted from the ore treated, the balance being obtained from the dump pile after it has undergone spontaneous decomposition. As this method of procedure is cheap and simple, and entirely practicable, wood and water being plentiful in all the cupriferous districts of California, it may reasonably be expected that it will soon come into extensive use here, insuring an early revival of this industry in the State.

Copper Deposits in Nevada.

During the period that copper mining remained so depressed in California, valuable bodies of this ore were discovered and in some instances extensively developed in both Nevada and Arizona. The first considerable deposits in the State of Nevada were discovered as much as ten or twelve years ago. They are situated in the Pine Nut Mountains at a point about forty miles southeast of Virginia City. The veins in this locality, several in number, are from six to ten feet wide, trend north and south and lie between limestone and quartzite. The ores, principally carbonates and red oxides, assay high in metal. A good deal of ore has been extracted here and sold to the blue stone works at Dayton, on the Carson river, none having ever been smelted or shipped to more distant markets. The gross product of these mines has amounted to over \$200,000. For several years past but little work has been done at this locality. As the Carson and Colorado railroad passes near them, it is probable ore extraction will in good time be resumed at these mines. Fifty miles further on, in the northeastern part of Esmeralda county, there exists a copper bearing range of great magnitude, the most of it being embraced within the Santa Fe and Soda Springs mining districts. These deposits were discovered and some of them located many years ago; but being in a desert region and far from available shipping points, little or nothing was done towards their development until within the past year or two, the advent of the Carson and Colorado Railroad in that section of country having led to renewed attention being given to these deposits, the most of which have since passed into the hands of parties having the means and enterprise to properly explore and bring them into a productive

condition, vigorous measures to that end having already been adopted.

The Santa Fe District.

Covering an area of fifteen miles by ten, lies in the mountain range that bounds Soda Spring valley on the north. To the northeast of it lies Gillis Mountain district and to the east, Arlington Spring arroyo. Within this area a large number of copper bearing lodes occur, many of which are being exploited. Some of these lodes show ore fissures of great strength and promise, carrying at or near the surface the most desirable and docile character of copper ores of a high tenor, ranging from twelve to sixty per cent. These ores consist of red and black oxides, (cuprites and malachites) blue and green carbonates (malachite azurite and silicates) with exceptional spots of sulphides (glance and peacock). One very strong vein carries native copper in sufficient quantities for stamp work. These ores are all singularly free from arsenic and antimony.

In the district are the following important groups of mines: The Sweet Vengeance, Stone Cabin, Jersey Blue, Copper King, New Camp, and the Brady's Camp, each group containing from four to eight distinct veins within a comparatively limited area, the nearest group being distant from Luning, on the railroad, two miles, and the furthest six miles, affording facilities for cheap transportation of coke and material to the mines and of the bullion product to a market.

These lodes, nearly all of which are gossan capped, crop boldly, coursing, as a rule, north-erly and southerly with the strike of the mountain range. With rare exceptions, east-erly and westerly veins occur—the most prom-ising are contact deposits lying between syenite and porphyry, or lime slate, dolomite and quartzite. The gangue is invariably silicious, and is found more or less with calcareous mat-

In addition to these arroyos, which afford natural roadways of easy grade from the metal bearing lodes to the valley, the ranges are di-vided lengthwise by washes or smaller valleys. This district must become, at no distant day, an important agent in the copper-producing factors of the world.

The town of Luning, on the railroad, is the shipping point for the Santa Fe, and also for Gillis Mountain, Garfield and the Silver Star districts, the valuable minerals in the latter three consisting chiefly of silver-bearing ores. Luning is an active and growing place, with the prospect of becoming in a few years quite a large town. Twelve miles south of Luning brings us to Soda City, so-called from two re-markable springs in the neighborhood, one hot and the other cold, but the waters of both possessing valuable medicinal properties. Soda City, like Luning, is a thrifty hamlet, being on the railroad and the shipping station for

The Soda Springs Mining District.

Lying adjacent. The deposits here are cuprif-erous, the geology of the country as well as the vein system and the character of the ores, being similar to those in the Santa Fe district. The greater portion of the more valuable lodes in this district are owned by the Esmeralda Cop-per Mining Co., the only parties who have as yet put up copper reducing works in this region of country or performed any very large amount of exploratory labor on their mines, some of which give incontestable evidence of large value. As at Santa Fe, the lodes here are large, shape-ly and compact, carrying rich ores in good body from the surface—which means profit from the start. These ores also contain their own fluxes, carrying lime and iron in about the proper proportions for effective smelting. A good deal of the ore here assays from 40 to 50 per cent. cop-per. This company have put up at Soda springs a 30 ton smelter, which for some time

The Bell Smelter.

The *Inter-Mountain* (Butte, Montana,) says: Next to the location of the Anaconda smelter, perhaps the most important question which has agitated the public mind in this city during the past six months has been the resumption of operations by the Bell company. With plenty of ore in the mine and with a smelter in fine shape for reducing an abundance of its prod-uct, there has been no doubt that a splendid financial success would follow the beginning of operations under the new management; but not till yesterday was it positively known when the furnaces would be fired up. In conversa-tion yesterday with Walter J. King, acting manager of the company, it was learned that at twelve o'clock to-day, in all probability, one of the blast furnaces, having a capacity of thirty tons daily, would be fired up, and if not to-day that Saturday would be the latest time when operations would be resumed.

The smelter is under the immediate charge of Prof. Pitman, whose reputation as a practical and scientific metallurgist is a sufficient assur-ance that the works will be conducted in the most economical and successful manner.

The ore supply at the smelter is abundant, there being 3,000 or 4,000 tons of ore already delivered and available for immediate reduc-tion. The vast amount of ore, it is estimated, will keep one furnace supplied for about three months, at the expiration of which time it is expected that the main three-compartment shaft at the mine, which is now 180 feet deep, will have attained a depth of 400 feet, and that the ledge will be fully opened through a north crosscut from the bottom station, thus allowing the easy and comparatively inexpen-sive extraction of all the ore the smelter can treat, with both furnaces in operation.

The news that the Bell smelter has resumed

The Brooklyn Bridge.

The famous Brooklyn bridge to connect the prosperous cities of New York and Brooklyn, and which has been in course of construction since January, 1870, will be formally opened for traffic on the 24th inst. Mr. Jno. A. Roe-bling originally estimated the cost at \$7,000,000, exclusive of the land required which has cost \$3,800,000. The actual cost when completed will be about \$15,500,000. One reason of this increase was the Government required an in-crease of five feet in height, making the clear-ance under the bridge 135 feet, and it was wid-ened from eighty to eighty-five feet. These changes cost eight per cent more. Steel was substituted for iron, and the approaches are masonry instead of wire rope. The following figures give a good idea of the dimensions:

Length of each land span,.....	930 ft.
Length of main span,.....	1,595 ft. 6 in.
Height main span above water,.....	135 ft. 6 in.
Length of N. Y. approach,.....	1,562 ft. 6 in.
Length of Brooklyn approach,.....	971 ft.
Depth of N. Y. foundations, below high water,.....	78 ft. 6 in.
Depth of Brooklyn foundation, below high water,.....	44 ft. 6 in.
Total height above high water,.....	271 ft. 6 in.
Height of railway at tower,.....	119 ft.
Width of openings through towers,.....	33 ft. 6 in.
Diameter of cables,.....	15-3/4 in.
Number of wires in each cable,.....	5,434
Sustaining power of each cable,.....	12,000 tons
Total length of wire in each cable,.....	3,515 miles
First wire rope stretched over the river, Aug. 14, 1876	
River first crossed on a wire rope,.....	Aug. 23, 1876
Footbridge finished and crossed,.....	Feb. 9, 1877
Commenced to build,.....	Jan. 3, 1870
From Sands St., Brooklyn, to Chatham St., New York, one and one eighth miles long.	



VIEW OF THE NEW YORK AND BROOKLYN SUSPENSION BRIDGE ACROSS THE EAST RIVER.

ter. Cupriforous ore bodies are also found on a highly crystalline lime stone (carbonate), but they are irregular and unreliable, only occur-ring in pockets or chambers, not sufficiently exten-sive for economic purposes, being soon ex-hausted. The ores of this district, by assay, show hut a small percentage of gold, but silver is often associated in sufficient quantities to materially add to the values of the copper prod-uct.

Iron (hematite) in dykes of considerable strength are found in the vicinity of these veins well adapted for fluxing purposes, though the veins themselves often carry their own fluxes—iron, lime or silica. The hills are sparsely tim-bered with nut, pine and juniper, and springs of good water are not infrequent in this range of mountains. Soda Spring valley, through which the C. & C. R. R. runs, has undoubtedly been, at some remote period, a southerly arm or extension of Walker lake. The resident In-dians have a tradition to that effect, and the water lines on the base of the surrounding mountains are plainly to be seen. Artesian water in abundance can no doubt be obtained at almost any point in the valley, as wells sunk to a depth of thirty-five feet invariably get an inexhaustible supply. The general elevation of the range above the valley is some 2,000 feet; the altitude of the valley above the sea level 4,000 feet.

Geological Formation.

These mountains are in the main metamor-phic, ranging to cambrian or lower silurian, and exhibit a succession of gray and black lime-stone strata, alternating with crystalline meta-morphic schists, vastly disturbed, tilted and broken extensively by massive intrusions of porphyritic and granitic rocks. There has been extensive erosion throughout, as is evinced by the sharp fissuring of the naked strata, and in the numerous deep arroyos that cut the mountain chains in a course generally trans-verse to their trend.

past has been turning out black copper, 96 to 97 fine, at the rate of five tons per day. They employ about 53 men—23 at the smelter and 30 at the mine. At present they are working but one of their several veins, this, the Blue Light, affording ore enough to keep the smelter fully employed. As they appear to have ore enough, an additional furnace will probably be erected before long.

The ore they are now reducing gives average assays eighteen per cent copper, though the company could profitably beneficiate this tract-able class of ores carrying not over ten or twelve per cent metal. They have a side track from the railroad to their smelter with a branch on each side, one for bringing in coke and other supplies and the other for carrying out bullion. There is wood enough in the vicinity for making steam, but English coke is used here for the smelter. This company being made up in part of parties interested in the famous Copper Queen mine of Arizona have aimed to admin-ister their affairs on the same sound and econ-omical basis adopted in opening up and out-fitting the above property. They run in debt for nothing. Expenses that cannot be fully met from the net earnings of the mine during its earlier stages of development are provided for by the sale of enough stock to make up the de-ficiency, and no more,

FRUE CONCENTRATORS. — In December last Mr. P. C. Du Bois put into the Gold Blossom mill at Ophir, Placer county, this State, two Frue and two Triumph concentrators, both of which machines separate the gangue from the mineral by an endless rubber belt. The ma-chines referred to have run side by side for several months. A short time since Mr. Du Bois desired to increase the capacity of his mill, and we are informed he has ordered five more Frue concentrators, indicating that after trial he was convinced of their superiority, and preferred them even at the increased price,

operations will be welcome to the entire com-munity, and particularly so to the patient stock-holders, who, though disappointed by the failure of the old management, have always expressed faith in the richness and productiveness of the mine, and many of them by personal inspection know it to be one of the most extensive and promising copper properties in the west. The energetic and economical management of Mr. James King has inspired all with a feeling of great confidence in the future, and it is consid-ered certain that hereafter the Bell company, as far as the success of its management and out-put are concerned, will take rank with the companies managing the Montana, Parrot or Colorado smelters.

THE statement is made by some of our miners that the charges of the Howell Company for the reduction of ore, added to the high rates for transportation, excludes all ores of a less assay value than \$100 per ton from treatment at Lynx creek. As the Howell Company are said to have enough ores of their own to oc-cupy their works to their fullest capacity for some years, it might be of advantage to our business men to consider the question of of-fering some inducement to millmen, who would undertake the erection of works that would meet the wants of the miners above referred to.—*Prescott Courier*.

THE Nevada (Cal.) *Transcript* says: Sunday, a 200-pound boulder, very rich in gold, was found in the Chinese claim situated on the south side of Omega, just below John Goyne's residence. The Chinamen refuse to give the value of the boulder, but it is said to contain a large quan-tity of the royal metal.

THE Carbonate Hill Mining Company has de-clared a dividend of five cents per share, or \$10,000, payable May 2nd. This will make \$40,000 to that date.

The adoption of a suspended span of 1,595 feet, at a height of 135 feet, determined the height of the towers (270½ feet) from which the span must be suspended. The cables are anchored inland, 930 feet back from the towers on each side. The anchorages are solid buttrical struc-tures of stone masonry, 119 by 132 feet at the base and rising some ninety feet above high water. They weigh 60,000 tons each. The bridge floor is an immense steel framework, consisting essentially of two systems of girders at right angles to each other. There are stays in every direction. The weight of the whole suspended structure (central span) is 6,740 tons; and the maximum weight with which the bridge can be crowded by freely mov-ing passengers, cars, vehicles, etc., is estimated at 1,380 tons, making a total weight borne by the cables and stays of 8,120 tons, in the pro-portion of 6,900 tons by the cables and 1,190 tons by the stays. The lengthwise pull in the cables and to the load becomes about 11,700 tons, and their ultimate strength is 49,200 tons.

We have several times before alluded to the details of construction of this bridge, and now refer to it only in general terms. The engraving herewith gives a good idea of its general ap-pearance. A most magnificent view of the sur-rounding country may be had from the bridge. As an engineering feat the bridge is unparalleled and reflects great credit on its designer the late John A. Roebling and his successor W. A. Roebling. The Brooklyn bridge will hereafter be one of the "sights of New York."

THE March product of the Lexington mine of Montana was 76,575 ounces of silver and 799 ounces of gold.

A NEW company to develop the coal mines at Pinacate and vicinity has been organized at San Diego, and is known as the San Diego Coal Mining Company.

Metallurgy and Ores.

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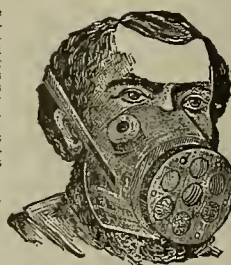
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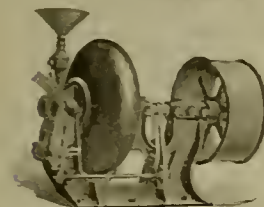
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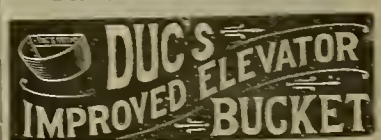
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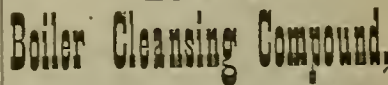


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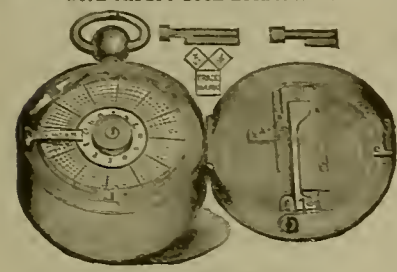
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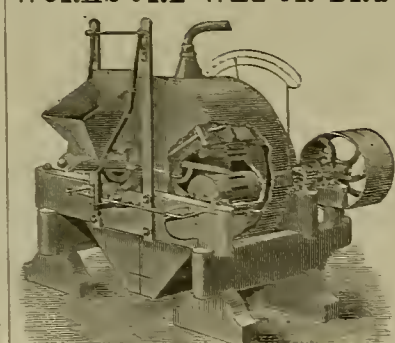
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR THE WEEK ENDING APRIL 17, 1883.

- 275,978.—STRAINER FOR WATER FAUCETS—Geo. F. Barrington, S. F.
 275,893.—DIRT SCRAPER—W. H. Daidrick, Salina, Cal.
 275,909.—DEVICE FOR REMOVING TIRES—N. B. Hervey, Santa Rosa, Cal.
 275,911.—FILE HANDLE—Geo. W. Hill, Starks Point, W. T.
 275,916.—PULLEY BLOCK—Jackson & Carter, S. F.
 275,842.—SPEED REGULATOR AND REVERSING DEVICE FOR ELECTRIC MOTORS—Molera & Celrian, S. F.
 275,865.—RUB-IRON FOR VEHICLES—D. Shelton, Santa Rosa, Cal.
 275,952.—CHANNELING RIVERS, ETC.—D. Spangler, Hanford, Cal.
 275,956.—SULKY PLOW—P. K. Stockton, St. Helena, Cal.
 275,963.—SEPARATING THE SEDIMENT, ETC., FROM SACHARINE JUICE OF SORGHUM—J. D. Vandenberg, Marshfield, Or.
 275,967.—TIRE SETTER—F. Winne, Orland, Cal.
 275,968.—FOLDING CRATE FOR FOWLS—Thos. F. Woodside, Modesto, Cal.
 275,969.—CRATE FOR FOWLS—Thos. F. Woodside, Modesto, Cal.

FOR THE WEEK ENDING APRIL 24, 1883.

- 276,217.—SEWER-GAS TRAP—A. Blatchly, S. F.
 276,223.—HARNESS BUCKLE—A. Cadwell, Petaluma, Cal.
 276,353.—CENTER BOARD—W. O. Christensen, Marshfield, Oregon.
 276,225.—SUPPLY APPARATUS FOR FEEDERS FOR THRESHING MACHINES—John P. Cobb, College City, Cal.
 276,365.—FRUIT PITZER—C. A. Curran, Albany, Oregon.
 276,530.—TRACTION WHEEL—Jos. Enright, San Jose, Cal.
 276,171.—CASE FOR CIGARETTES—E. J. Fraser, S. F.
 276,239.—CABLE RAILWAY—A. S. Hallidie, S. F.
 276,240.—TRAVELING BAG—A. S. Hallidie, S. F.
 276,241.—PORTABLE HANGING SCAFFOLD—J. H. Hanavan, S. F.
 276,244.—SUSPENDER HOOK—H. M. Heinemann, S. F.
 276,181.—DRY ORE CONCENTRATOR—Jos. Hubert, S. F.
 276,418.—SHOE AND DIE FOR AMALGAMATING PANS—Johnson & Osborn, Dos Cabezas, A. T.
 276,424.—LEMON SQUEEZER—Kelly & Wimmer, S. F.
 276,185.—STEAM BELL RINGER—E. Lawson, S. F. Cal.
 276,492.—HAIR SPINNING MACHINE—John Spaulding, S. F.
 276,493.—SEDIMENT COLLECTOR FOR STEAM BOILERS—John Spaulding, S. F.
 276,494.—CARPET BEATING MACHINE—John Spaulding, S. F.
 276,393.—WHEELED SCRAPER—L. A. Sweatt, Santa Clara, Cal.
 276,320.—HORSE POWER—W. H. Worth, Petaluma, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

DIRT SCRAPER.—Wm. H. Daidrick, Selma, Fresno Co., Cal. No. 275,893. Dated April 17, 1883. This invention relates to that class of dirt scrapers used in leveling land. The invention consists in adjustable runners upon which the bowl of the scraper may run when dumped, in adjustable draft bars, and in an adjustable stop to limit the dump of the bowl. The object of the several improvements is first, by adjusting the runners, to so regulate the height of the bowl, and especially its bit, from the ground, that the dirt shall be dumped either suddenly in one place or gradually discharged and scraped over the ground, as the necessity of the case may require; second, to graduate the power required to make the bit take hold of the ground, and to dump the bowl as may be desired; and, lastly, to limit the dump at any desired point.

LEMON SQUEEZER.—Albert C. Kelley and Geo. W. Wimmer, S. F. No. 266,424. Dated April 24, 1883. The lemon squeezer consists of two jaws suitably shaped to receive the lemon or other object. One of these jaws has two handles hinged to its sides, while the other has a stem extending back centrally between the handles, to which it is united by a knee lever, so that when the handles are closed the two jaws will be made to approach each other.

SEWER GAS-TRAP.—Ambrose Blatchly, S. F. No. 276,217. Dated April 24, 1883. This improved trap consists of a peculiarly-shaped chamber, in the bottom of which mercury is placed, so that a complete metallic gate or trap is formed to prevent the passage of gas. The chamber is made of glass or other transparent material to permit an inspection of its contents, and is of such a shape that the level of the mercury will not be raised too high when the water is passing through the trap.

SUPPLY APPARATUS FOR FEEDERS FOR THRESHING MACHINES.—John P. Cobb, College City, Colusa Co., Cal. No. 276,225. Dated April 24, 1883. This is an apparatus for receiving and conveying unthreshed straw to threshing machines. The straw is usually deposited from the stack or header wagon, on a table in close proximity to the feeder. From this pile the straw is raked down upon the belt by hand. This system is done away with by this invention, as a peculiar pan-shaped receiver is provided, and the mass of straw which is dropped into the receiver by the derrick fork, is distributed by revolving arms with teeth so as to be fed with regularity upon the carrier belt and by it carried to the threshing machine. The receiver is mounted on wheels so as to be transported from place to place.

WHEELED SCRAPER.—Leroy A. Sweatt and John Patzo, Santa Clara, Cal. No. 276,303. Dated April 24, 1883. This invention relates to the class of wheeled scrapers for grading. The improvements consist in a means for holding it at any inclination for dumping it, in a novel adjustable guard for the front of the scoop, in a means for turning the entire device in a small space, and in certain minor details of construction. The object is to provide a device for leveling or grading the ground, the scoop of which may easily be raised to transport the earth or held at any inclination, or turned to dump it, and one wheel, on account of the length of its frame will reach effectively the small elevation, and at the same time may be easily turned in a small space.

CABLE RAILWAY.—Andrew S. Hallidie, S. F. No. 276,239. Dated April 24, 1883. This is an improvement on the cable railroads such as are in use in this city and elsewhere, and with which Mr. Hallidie has been identified since their inception. The improvement consists in a novel construction of a cellular metallic covering for the tube, having a filling of wood or asphaltum, which provides a secure footing for horses, in place of the broad and slippery surface of iron, which is usually necessary to keep the sides of the slot from spreading. This cellular covering forms also a rigid boundary for the slot, in place of the iron ordinarily employed. The cellular metallic covering is made so as to be removable without disturbing the paving of the street.

PORTABLE HANGING SCAFFOLD.—John H. Hanavan, S. F. No. 276,241. Dated April 24, 1883. This is a hanging scaffold, which may be readily taken apart and packed for transportation. The great advantage of the device is that it leaves all underneath free, and a workman can be engaged under the scaffold at the wall without having it in his way, as is the case when platforms with legs are used. The adjustability of the brackets provides for high ceilings, where, after working within reach above, the floor may be lowered to allow the workman upon the scaffold to meet the highest limit of the workman below. By being hung from the joists it is entirely out of the way, and as firm as though supported from below.

CRATE FOR FOWLS.—Thomas F. Woodside, Modesto, Cal. No. 275,969. Dated April 17, 1883. The crate for fowls consists of an adjustable partition moving upon guides within the crate, and provided with an adjusting and locking mechanism, by which it may be secured at any desired point, and thus divides the crate or cage into compartments of any desired size. Another patent by the same inventor for a crate for fowls bears the same date. It is a peculiar construction by which the crate is made to fold or collapse after it is empty, so as to be convenient for shipping.

SULKY PLOW.—Philip K. Stockton, St. Helena, Cal. No. 275,956. Dated April 17, 1883. This sulky plow is specially adapted for use in vineyards, or for plowing such plants as are in rows. The invention consists in combining a right hand and a left hand turning plow, or two or more of them, on a frame, so as to fall toward each other, or away from each other, the plows being movable on said frame, so that the furrows can be thrown, two or more at a time, toward the center or away from the center.

SUSPENDER HOOK.—Harry M. Heinemann, S. F. No. 276,244. Dated April 24, 1883. This is an improved means of attaching suspenders to pantaloons or other similar garments so as to make a strong fastening not likely to be broken and at the same time one easy to be detached. It consists of a hook so formed as to receive the buttonhole or loop of the suspender, said hook being permanently secured to the waistband of the pantaloons.

HARNESS BUCKLE.—Alexander Cadwell, Petaluma, Cal. No. 276,223. Dated April 24, 1883. This improved article of manufacture consists of a harness buckle having a frame and tongue with bent point fitting a socket or hole on the front of the frame, and having under its front side projections or guards inclosing the sides of the strap.

HORSE-POWER.—Wm. H. Worth, Petaluma, Cal. No. 276,320. Dated April 24, 1883. This invention relates to certain details of construction of horse-powers, by which they are made simpler and stronger.

TRAVELING BAG.—Andrew S. Hallidie, S. F. No. 276,240. Dated April 24, 1883. This invention covers an improvement in bags such as are employed by travelers. It consists of a bag or receptacle formed in the usual, or any convenient shape, and having the ordinary exterior covering material, inside of which is a lining of flexible wire netting, to prevent the material being cut through and the contents of the bag stolen. The flexible wire netting, while it prevents the bag being cut open, will allow it to be folded or expanded nearly as freely as when made of the usual material, and within this may be the ordinary cloth lining, by which it is concealed from view. By providing this bag with a stout frame and good lock, it will be burglar-proof, and may be used to transport money or other valuables.

News in Brief.

The Chinese Minister in Washington has decided to establish a Chinese Consulate in New York.

The sacred vessels and the poor box of the Catholic church at Watsonville were stolen recently.

It is estimated that the Government loses annually \$500,000 by smuggling carried on along the Rio Grande.

The greater part of the Eastern excursionists who have just arrived in the State, have gone to the Yosemite valley.

Red cranes are quite plentiful on the plains about Santa Monica. They are frequently shot, and make excellent eating.

The ship laborers at St. Johns, N. B., have refused to work on vessels where steam power is used in loading. The reason assigned is the frequency of accidents.

The war-worn Tombstone rangers have returned to Tombstone, footsore and weary, and without any scalp at their belts. As is usual in such organizations, they quarreled among themselves.

It is considered improbable that the attack of the *North German Gazette* upon the American Minister involves his resignation. Sargent has had little direct intercourse with Bismarck since his arrival.

JAMES R. KEENE is selling out his picture gallery and will join his family in Europe this summer. Jay Gould bought a Rosa Bonheur cattle picture for \$16,000, and Henry Clews bought three other paintings for about \$25,000.

The Government has cautioned General Crook not to cross the frontier. His understanding with the Mexican authorities gives him the privilege of doing so. The Government evidently has received no official information of the result of his consultation with Mexican officials.

SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD.—We would call the attention of our readers and mining men in general to the advertisement in another column of the San Francisco Plating Works, E. G. Denniston proprietor, 653 and 655 Mission street. The silver-plated mining plates which Mr. Denniston manufactures have proved a great success in both quartz and placer mining, and are used everywhere. Mr. Denniston is running his works constantly, filling orders for the Pacific coast and Rocky Mountain mining States, Mexico, Central and South America, Australia, New Zealand, British Columbia and Alaska. This establishment is the most extensive and successful in the manufacture of these plates of any in the United States. The plates made here have proved durable and satisfactory. Full weight of silver guaranteed on every order. Over 2,000 orders have been filled. Owing to the great demand for these plates, and increased facilities, they will be sold at reduced rates. Quartz and placer miners would do well to call or send for price list.

A SURVEY has been made for the Oregon Short Line to run through Boise City, and orders have been given to stop further building on the old survey.

To STRENGTHEN and build up the system, a trial will convince you that Brown's Iron Bitters is the best medicine made.

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 S. M. RUMYON,
 77 & 779 MARKET ST., San Francisco.

NOTICE OF REMOVAL.

The Clayton Steam Pump and Air Compressor Works would respectfully announce that they will remove May 1st, to their new works, 45 and 47 York St., Brooklyn, N. Y. (near the approach to the New York and Brooklyn Bridge.)

STRENGTH

to vigorously push a business, strength to study a profession, strength to regulate a household, strength to do a day's labor without physical pain. All this represents what is wanted, in the often heard expression, "Oh! I wish I had the strength!" If you are broken down, have not energy, or feel as if life was hardly worth living, you can be relieved and restored to robust health and strength by taking BROWN'S IRON BITTERS, which is a true tonic—a medicine universally recommended for all wasting diseases.

501 N. Fremont St., Baltimore

During the war I was injured in the stomach by a piece of a shell, and have suffered from it ever since. About four years ago it brought on paralysis, which kept me in bed six months, and the best doctors in the city said I could not live. I suffered fearfully from indigestion, and for over two years could not eat solid food and for a large portion of the time was unable to retain even liquid nourishment. I tried Brown's Iron Bitters and now after taking two bottles I am able to get up and go around and am rapidly improving.
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BROWN'S IRON BITTERS is a complete and sure remedy for Indigestion, Dyspepsia, Malaria, Weakness and all diseases requiring a true, reliable, non-alcoholic tonic. It enriches the blood, gives new life to the muscles and tone to the nerves.

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 Elevator Works,

116 and 118 Main Street, San Francisco.

Manufacture all kinds of

Patent Hydraulic, Air Pressure, Steam and Hand Power

ELEVATORS,

With the Latest Improved Appliances.

TO HYDRAULIC MINERS.

We recommend our

IMPROVED GIANT,

Lately introduced, as being the best Hydraulic Machine ever manufactured, being simpler, lighter, cheaper, and more easily worked than any style before used. They are giving satisfaction to all parties using them. A cut is being prepared and will appear in a future issue. The machine is fully protected by patents owned by us, and we will guarantee our customers.

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"Challenge" Ore Feeders.

OVER 1100 HAVE BEEN IN SUCCESSFUL OPERATION.

Awarded First Premiums at the Preceding and last Industrial Fairs of the Mechanics' Institute of San Francisco.

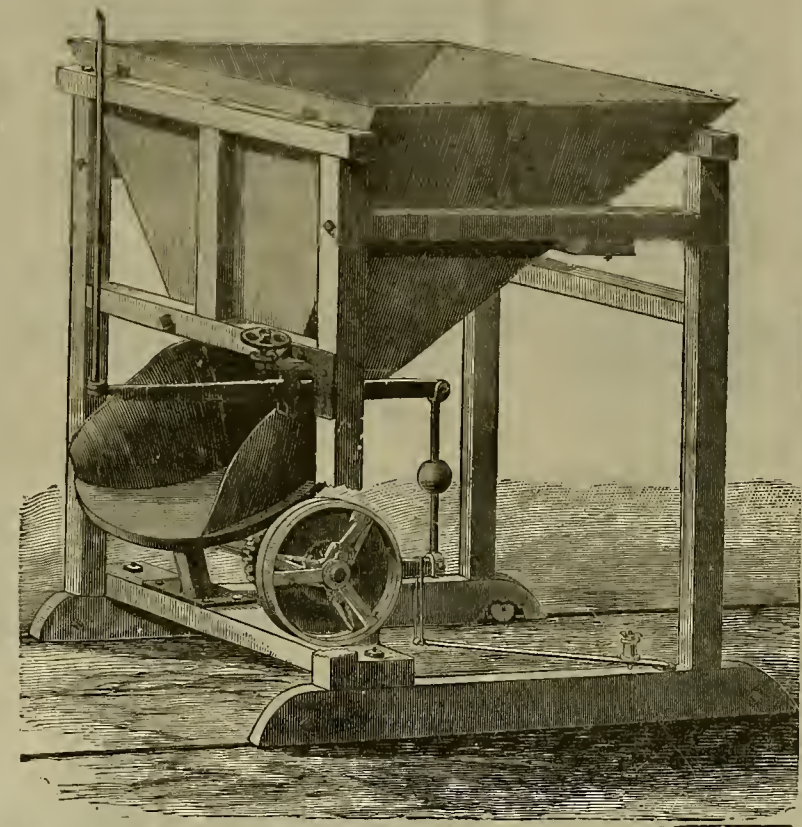
TWENTY PER CENT. MORE ORE CRUSHED WITH FIFTEEN PER CENT. LESS WEAR OF IRON THAN BY THE OLD METHOD OF HAND-FEEDING.

The opposite cut illustrates this recently-introduced Gulp and Spring Attachment, which replaces the Weight originally used, and results in an obvious improvement. The practical operation of the large number of these machines now in use demonstrates the fact that the principle upon which a perfect Ore Feeder must be constructed is that of a carrier and not that of a shoving table. Uniform feeding is no possible upon the latter plan. The ore must be evenly carried upon a steady, advancing plate or table to the line or point of discharge, and there be simply dropped. Jerky or spasmodically acting contrivances will not answer the purpose for feeding wet or sticky ores, nor for the ores of mines where they may change from sharp quartz to an intermixed material of quartz and earthy matter.

Thee Feeders are in Successful Practical Operation in the following Quartz Mills, and are giving Perfect Satisfaction to their Managers.

Compton's...	20 Stamps...	Mariposa county, Cal.
Soulsby...	20 " "	Tuolumne " "
Patterson...	20 " "	" " "
Sheep Ranch...	20 " "	Calaveras " "
Mahoney...	40 " "	Amador " "
Zille...	40 " "	" " "
Pacific...	40 " "	" " "
Nashville...	20 " "	El Dorado " "
Gross...	20 " "	" " "
Julian...	10 " "	Placer " "
St. Patrick...	15 " "	" " "
Providence...	30 " "	Nevada " "
Empire...	20 " "	" " "
Idaho...	20 " "	" " "
Green Mountain...	60 " "	Plumas " "
Plumas-Eureka...	60 " "	" " "
Bulwer-Standard...	30 " "	Bodie, Mono, " "
Standard...	20 " "	" " "
Noonan...	30 " "	" " "
Big Dry Creek...	10 " "	Fresno " "
Mexican...	44 " "	Lyon county, Nevada.
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Hidden Treasure...	40 " "	" " "
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And in many other Mills in the Mining Districts of the entire United States, and as well in Nova Scotia and Australasia. The superiority of these Feeders over other manufacturers has been so thoroughly demonstrated that it is not deemed pertinent to cite the numberless instances of this fact.



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CATALOGUE AND PARTICULARS FURNISHED UPON APPLICATION.

ASSESSMENT NOTICE.

Seaton Gold Mining Company.—Location of principal place of business, San Francisco, California; location of works, Drytown, Amador county, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the 10th day of April, 1883, an assessment (No. 2) of even and one-half cents (7 1/2) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Treasurer, A. Warner, at his office, No. 224 Kearny street, room 2, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 14th day of May, 1883, will be delinquent and advertised for sale, of public auction, and unless payment be made before, will be sold on Tuesday, the 5th day of June, 1883, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. A. MARTIN, Secretary.

OFFICE—Room 6, 528 California street, San Francisco, California.

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THE CELEBRATED A BRAND.

Shipped Direct from the New Almaden Mine, New Almaden, Santa Clara Co., Cal.

For sale in any quantity. Trademark A group of Flasks secured by United States Patent, and registered. Alaska contain 70 lbs. Quicksilver. Weight and purity warranted.

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At Greatly Reduced Prices.

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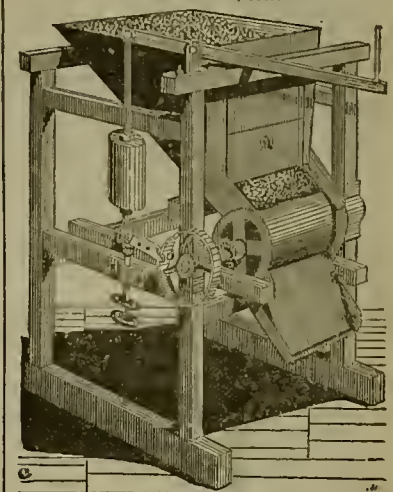
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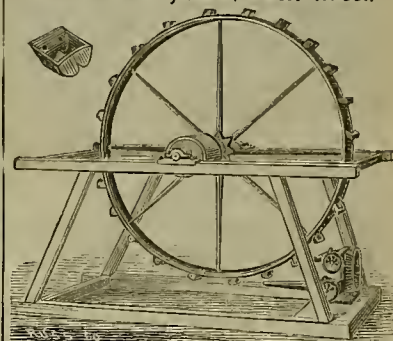


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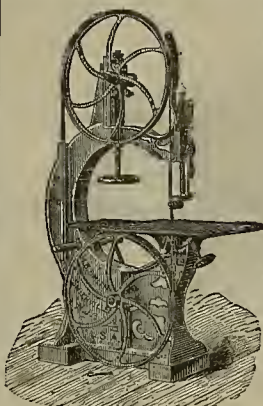
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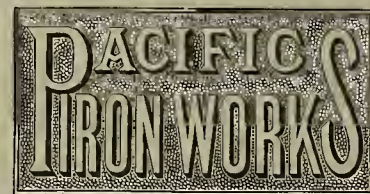
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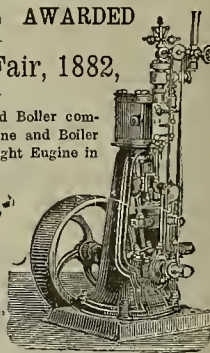
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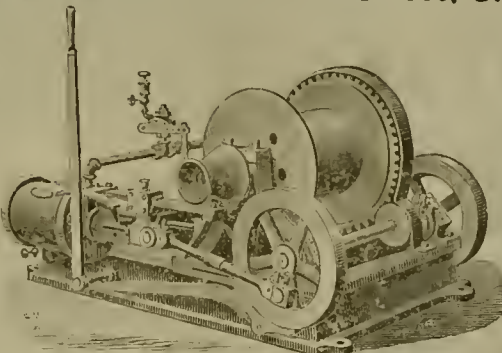
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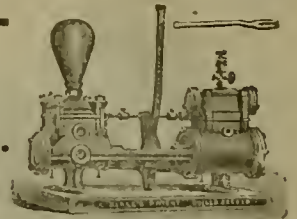
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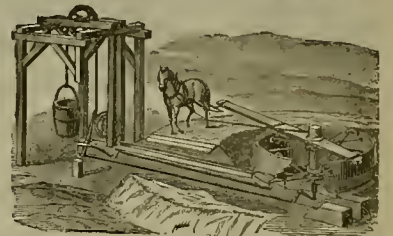
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1 to 100 Horse Power.

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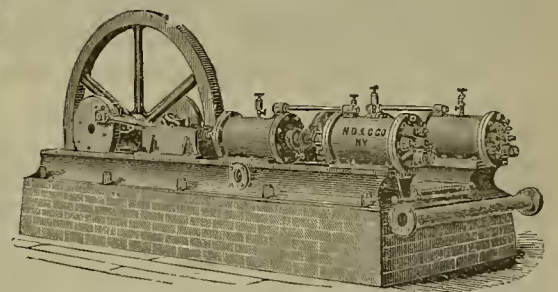
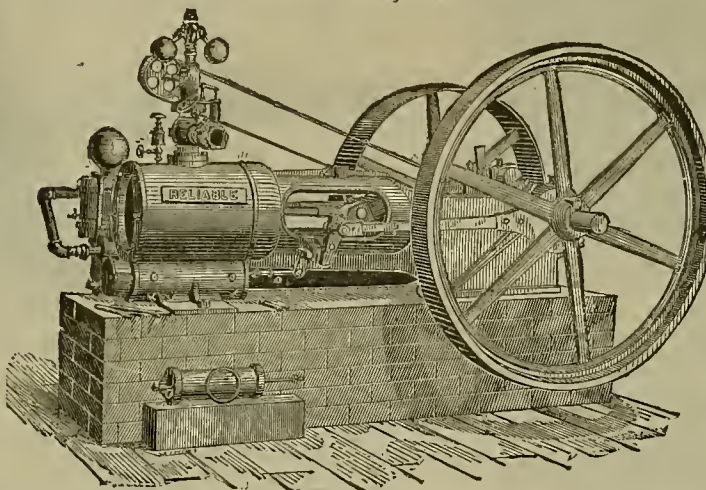
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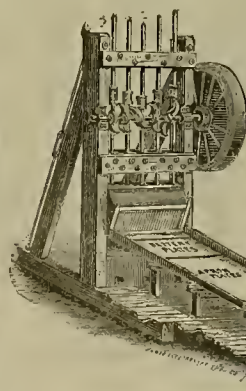
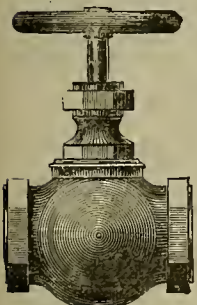
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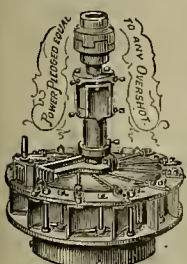
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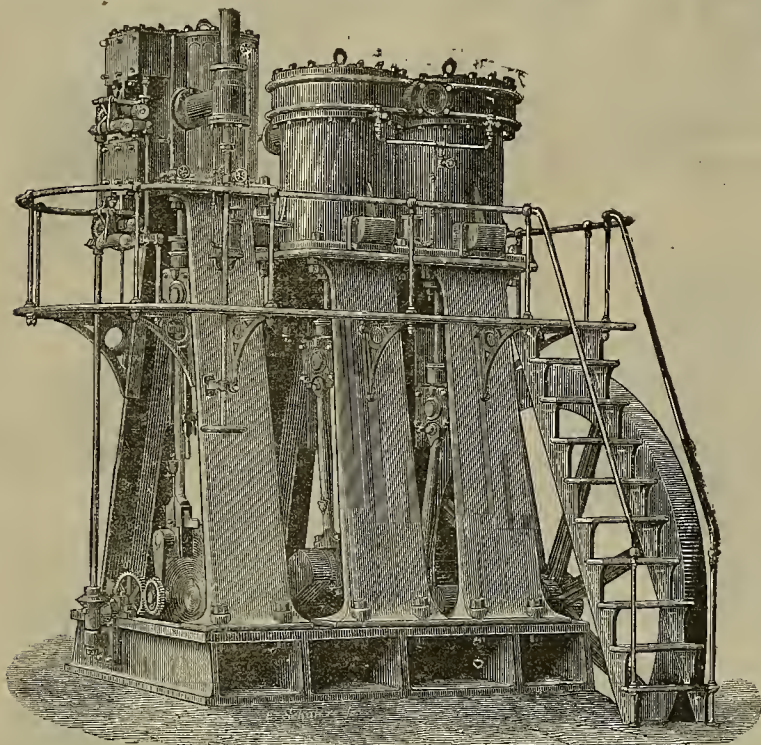
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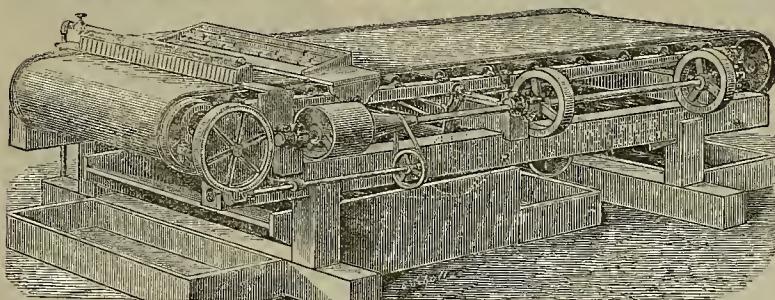
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That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for. That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

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Nov. 6 1882

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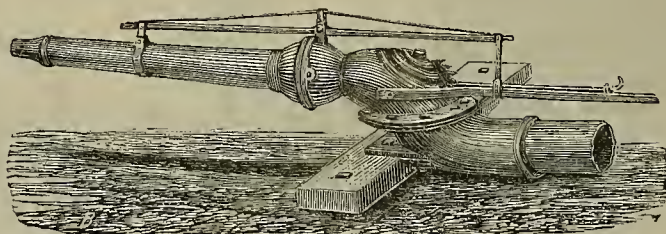
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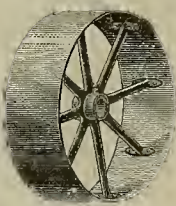


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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MAY 12, 1883.

VOLUME XLVI
Number 19.

Electric Light for Street Lighting.

Within the past few years probably nothing in the scientific world has attracted so much attention, as the questions connected with the use of electricity; more particularly those referring to lighting and power. In the matter of lighting great strides have been taken, and the problem of the use of the electric light for streets has been solved, the system gradually forcing its way into favor. The Brush system has been applied in so many places now, that it has passed the experimental stage, and experience has proven its utility.

In this city a large establishment furnishes light to individuals, and in front of many large buildings and places of business the light is conspicuous. In San Jose the tower plan has been adopted, as we described and illustrated a few months since. In Los Angeles masts for the electric light have been erected, and now a number of lights from these high points light the city, the company having a contract with the municipal corporation. Engravings on this page show the form of the lamp, and also the appearance of the mast on which the light is placed.

In another column of this number of the PRESS (page 322) we give the detail of the use of the lift in Los Angeles, where it has given great satisfaction, and displaced the gas for street lighting. It is probable that other cities on this coast will adopt the system of electric lighting when the advantageous results become more widely known.

The Mechanics' Fair.

It was supposed by some that the usual annual fair of the Mechanics' Institute would be omitted this year, owing to the use of the building by the Triennial Conclave. This is not so, however, as the fair will be held as usual. The only change is a postponement of the exhibition to a later date than has usually been the case. It will open September 11th, and close on October 13th. A meeting of the Board of Trustees of the Mechanics' Institute was held on Tuesday evening, when an organization was effected of the Board of Managers of the Eighteenth Industrial Exhibition. It was decided to give premiums, a list of which will be issued as soon as possible, and sent with circulars to Pacific coast manufacturers, all former exhibitors, and to those who will be likely to have products to show.

As we are growing in manufactures, it is to be hoped that the fair will excel all previous ones in this connection. There is no reason why a very creditable exhibition cannot be made, if those for whose interest the fair is arranged, will cooperate with the managers by coming forward promptly with their exhibits. The Board of managers for this fair is as follows: P. B. Cornwall, President; A. W. Starbird, vice President; J. A. Bauer, Treasurer; B. Jackson, C. Waterhouse, D. A. MacDonald, J. Pendergast, James Spiers, David Kerr, C. F. Bassett, J. R. Wilcox, Geo. H. Hopps, E. Fretwell, Geo. Spaulding. Although the officers are not yet appointed, it is probable that J. H. Culver will be Secretary, and J. H. Gilmore, Superintendent.

A CORRESPONDENT of the Bodie Free Press advises miners to stay away from Mount Cory district, Nev., as there are none over there that can make a living. The Mount Cory mine only employs fifteen men.

Improved Lifting Apparatus.

Clarence Sanborn, of Sacramento, has just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a new lifting apparatus of that kind in which great power is necessary, and in which the apparatus is required to stand at any point where it may be left. An engraving of Mr. Sanborn's device is given on this page. It is a simple and effective arrangement, as may be seen. It consists of a pulley, over which the lifting chain passes,



Electric Light Mast in Los Angeles.

and upon the same shaft two gear wheels, so fixed that their teeth alternate, that is, the teeth of one wheel correspond with the spaces of the other. The pulley over which the actuating chain or rope passes is fixed to shaft, which has short crank arms formed upon it corresponding with the gear wheels and with the size of their teeth, so that when the shaft is rotated, the crank arms or pins engage the teeth of the gear wheels, one after the other, and thus advance the chain pulley. This device also forms a perfect lock when left at any point.

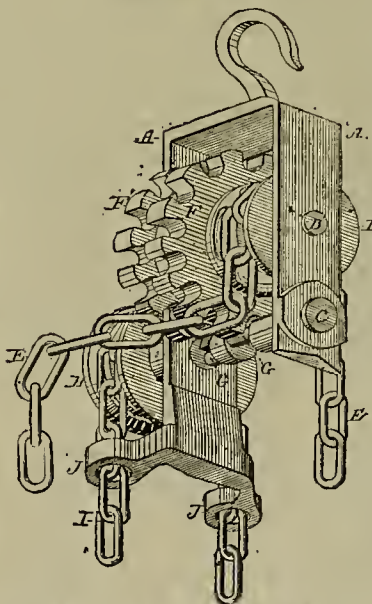
A is a frame of any suitable form and size on which the gear and pulley shaft B is supported, while below this the cranked driving shaft C is journaled. On the shaft B is fixed the chain pulley D, having its periphery formed so as to prevent the hoisting chain E from slipping. On the same shaft are fixed two gear wheels FF. They are placed side by side, with a small inter-

vening space. These gears stand so that the teeth of one stand opposite the spaces of the other.

The shaft C has formed in it two eccentric pins, or short crank arm G, which stand on opposite sides of the axis of the shaft. The throw of these pins is fixed by the distance between the teeth of the gear wheels with which they correspond, so that as the shaft is revolved the pins enter the spaces between the teeth alternately, and thus advance them and turn the shaft and hoisting chain pulley. The pins



The Brush Light.



Sanborn's Lifting Apparatus.

in their revolution pass over the points of the teeth and into the spaces between them, without slip or lost motion, and with the least possible friction. When allowed to stand, with a weight suspended from the chain, the pins will lie in the spaces between the teeth, so as to form a perfect lock, and prevent the shaft from turning back. On the end of the shaft, C, is fixed a pulley, H, which is usually a chain pulley with an endless chain, I, passing over it and depending to a point within easy reach of the operator. Guides, J, depend from the frame, and the chain passes through them, so the chain is kept on the pulley when moving rapidly. This little piece of mechanism, though simple, is very ingenious in design.

THE Russian annual gold product we have seen recently reported at 2,000 pounds, worth in the aggregate, \$24,000,000, of which Eastern Siberia supplied \$18,000,000.

Gold Mining in Venezuela.

There is very little known of the mines of Venezuela outside of that country, although some portions of the region are very rich. On the northeast side of the Orinoco river are good quartz and placer mines. But the region is not healthy, and there is more fever and ague than gold. At the Caratal mines there are some English and some American companies working, but the latter are most numerous. Philadelphia people have several claims working gold quartz. This is in the State of Guayana.

In other parts of Venezuela the diggings were worked out by the Spaniards 100 years ago; still there are places which can be worked now, by the hydraulic system. Most of the placer work there is done by ground sluicing. Don Gonzales Guinan, of Valencia, State of Caribago, has the best mine they have opened. Some parts of his mine were worked out. On some parts of the claim there are big trees growing in the old excavations made by the former miners, but the ravines and gulches were the main sources of the wealth to these old miners. The small gulches, or *carradas*, are all thoroughly worked out.

Labor costs about eighty cents per day. There is plenty of water to run a hydraulic the year round, and a fine ditch has been made to bring it to the claim. The place belonging to Don Gonzales Guinan is called Mount Veruon. It is fifteen miles from Valencia. Mr. Guinan owns a league of land. They have by this time appliances for working the gravel beds by hydraulic process.

The old Spaniards, by following the rivers and searching the ravines discovered quantities of gold in the rivers Tesorero, Santa Cruz and Guaratarro, which abounded in large nuggets; the remains of their workings can be seen at the present day. The Caratal gold field is about 160 miles east southeast of Ciudad Bolivar, in Angostura, State of Guayana. It lies 100 miles south of the river Orinoco, some seventy-five miles up from the principal mouth.

When the dry season commences the rivers and streams sink rapidly; many dry up entirely; others still have a few water holes left. Then banks of sand and gravel are left high and dry, or partially so. On digging through these a gold-bearing bed is often met with, which furnishes nuggets and small grains of gold on washing.

CHEAP MILLING.—In commenting on an article in the MINING AND SCIENTIFIC PRESS of the 28th ult., in which the expense of milling ore in Southern Arizona is mentioned, the Prescott Courier says: "In our opinion it is this cheap milling of ore that has conducted so largely to the great prosperity of the southern portions of the territory, and this cheap milling is the result of care, forethought and the adoption of all labor-saving devices which have been discovered in practical metallurgy within the past few years. What the results will be in our own section, when the same careful and intelligent ways are brought into use in our mining camps, we leave it to our readers to imagine. A camp that has solved the problem of reducing silver ores at a cost of less than five dollars per ton, can have no fears for the future if it has mines deserving of the name."

THE pay rolls of the Ophir, Mexican, Union Consolidated and Sierra Nevada for the month of April, says the *Territorial Enterprise*, aggregate \$28,518; California, Consolidated Virginia and C. and C. shaft, \$15,170; Union shaft, \$10,856; Utah, \$4,253, making a total of \$58,797 for the six mines mentioned.

The Soils of California.*

A General Review of the Quality of Our Agricultural Lands

While it would be impossible to give, in any brief space, a detailed account of the great variety of soils occurring within the wide area of the State of California, only a few of which have as yet received any close examination, some general statements may be made to show the high value of some of the apparently most arid lands, when subjected to the life-giving influence of irrigation.

As regards, first, the great valley, the two climatic divisions defined above are maintained also, measurably, as concerns the soils. Broadly speaking, it may be said that in the northern division (the Sacramento valley) the soils are prevalently loams, more or less heavy, largely interspersed with tracts of heavy clay or "adobe" soils, often the exact counterpart of the "prairie" soils of the Mississippi valley; while in the southern portion, or San Joaquin valley, the bulk of the soil is altogether prevalently sandy, occasionally to the extent of rendering them sterile; and what is there called "adobe," by way of contrast, would mostly be elsewhere considered a moderately clayey loam. As to intrinsic fertility, it would be difficult to decide between the two divisions; for while the heavier soils, other things being equal, are usually the richer in plant food, and therefore the more durable; the great depth of the light soils of the San Joaquin valley seems to compensate in a measure for the somewhat inferior percentage of plant food. This is the more true, as the "sand" is, to a considerable extent, not simply siliceous, but consists largely of comminuted gigantic and eruptive rocks, with an admixture of the ancient slates, or rather schists, which cover the flanks of the Sierra and constitute the proverbial "bed rock." Moreover, the "foothills" are commonly bordered, on the valley side, by a rolling plateau land, underlain by the marly strata of the tertiary formation, and these, commingling with the materials brought from the higher lands, form naturally marled soils, whose thriftiness, when under irrigation, contrasts strikingly with their barren aspect during all but the winter and early spring months, so long as they remain in their natural condition.

From Redding, at the head of the Sacramento valley, to Bakersfield, at that of the San Joaquin, the valley has along its eastern border a belt of upland, varying in width from one to twenty miles, and from twenty to fifty feet above the natural drainage level, the soil of which is a yellow or reddish loam of varying character, evidently formed by the intermixture of the red soil of the foothills with the valley deposits. Much of this land, which is mostly too high to be reached by the present irrigation canal, has a singular hillocky surface, known as "hog wallows," doubtless the results of aqueous erosion in past periods. These "hog wallow" lands differ essentially both in their character and origin from those similarly named in Texas and other Gulf States (which are mostly heavy prairie soils), and even as far south as Merced county produce excellent cereal crops, as well as fruits, without irrigation.

On the western, or Coast Range side of the valley, the soils are usually materially different. The Coast Range consists in the main of gray tertiary and cretaceous materials, prevalently clayey northward of San Francisco bay, but growing more and more sandy, on the whole, in a southward direction. Hence, we find extensive tracts of very stiff "adobe," all of very variable degrees of fertility, on the western side of the Sacramento valley, and as far south as the southern line of San Joaquin county, where the widely gaping cracks of the adobe, during the dry season, attract the attention of even the casual passer-by. Southward, the soils lying at the foot of the Coast Range become increasingly sandy, as do the bordering hills, until, in the region opposite Tulare lake, it is reported to be a "sandy desert." This statement may require to be taken with a considerable grain of allowance, since in the absence of any opportunity for irrigation, and of any serious attempts at settlement thus far, the capabilities of the region can hardly be said to have been fairly tested.

The soils of the western border of the Sacramento valley are at many points materially and most beneficially modified by the admixture of materials contributed by the tributary valleys heading within the region of eruptive or volcanic rocks, whose southern portion has become noted for the high quality of the vines produced in the valleys of Sonoma and Napa. These soils are also originally red, as is still the case on the mountain sides and higher benches of the valleys, and while less suited to cereal culture, they seem to be pre-eminently adapted to the perfecting of the higher qualities of fruits.

The orchard products of Vacaville, widely known for their excellence, are grown on such soils, and the fruit growing region of Solano and Yolo counties, the present center of the raisin industry, is covered by the joint deposits of the Sacramento river and Putah creek, the latter one of the main drains of the volcanic region.

Soils quite similar to these, both in origin and productive qualities, exist on the opposite side of the valley, where the Tuolumne, Mokelumne and Cosumnes rivers traverse the volcanic tuffs that cover the gold-bearing gravels of

Table Mountain. As regards their general chemical character, the soils of the entire valley (of which quite a number have been analyzed, partly under the direction of the State Agricultural College, partly under those of the Census Office), are throughout remarkable for a high percentage of lime, which rarely falls below four tenths of one per cent, and most commonly ranges from one half to one and a quarter per cent. This circumstance explains, in a measure, the high thriftiness of these soils, allowing the rapid development and generous fruiting which accompanies the minimum allowance of moisture, and maintains the farmer's hopes, that the success of a single season will suffice to wipe out the financial failures of two or three dry seasons. A generous allowance of potash accompanies the lime, even in the very sandy soils of the Tulare plains, mostly exceeding four tenths, and ranging as high as one and a quarter per cent. The phosphates are on the whole low in the sandier soils of the San Joaquin Valley, but high in the adobe soils of both divisions.

The red soils of the foothills have already been mentioned. The character of the foothills of the Sierra Nevada throughout its course along the great valley, varying from a moderately clayey loam (as in the placer region of El Dorado and Placer counties) to a heavy, though not uncommonly gravelly, is an orange-red clay. This character seems to be sensibly the same, whether the soil be derived from the decomposition of the ancient slate "bed rock" or directly from the granite rocks, thus creating a presumption that the two rocks are closely related.

Where the foothill soils either obtain a sufficiency of moisture naturally, or can be irrigated, they prove abundantly productive, and are rapidly acquiring a special reputation for the excellence of their fruit product, both of orchards and vineyards. While at present it is in the main a region of spring pastures, it is doubtless destined to be in the future one of small farms, producing products of high value. The soils are highly charged with iron (ferrie hydrate or rust) to the extent of from seven to over twelve per cent; which, being finely divided, imparts to them the intense orange-red tint so familiar in the region of the placer mines, and during the dry season manifesting itself in the equally familiar red dust that disguises the natural tints even on the trees themselves. The soils of the foothills, so far as have been analyzed, agree with the soils of the valley in having a high percentage of lime, from about one third to one and a half per cent, while the supply of potash and phosphates, as well as of organic matter, is smaller, and sometimes low, though never apparently inadequate for present productiveness, in the presence of so much lime.

The soils of the Coast Range, vary greatly in the different portions of that broad belt of hilly land. In the middle portion, more or less directly related to the bay of San Francisco, the "adobe" character is prevalent, not only in the valleys, but even on the summits of its rounded ridges, where, in favorable seasons, the yields of grain may be as high as in the valleys themselves. The soil is usually many feet in depth, with only here and there a rocky knoll projecting through it; cracks wide open in summer, and when the rains come somewhat abruptly and violently, the water, descending quickly to the underlying bedrock, gives rise to innumerable land slides, sometimes of considerable extent, and of vital importance to land owners.

In the valleys intersecting such regions, notably along the border of San Francisco bay, there lie highly fertile tracts of black adobe, or black prairie soil, sometimes so stiff and waxy as to be difficult to till, but under good treatment and in favorable seasons, profusely productive. The adobe tracts are intersected at right angles to the bay by the belts of lighter sediment brought down by the present streams.

In the country lying northward of the bay, the soils formed by the eruptive and volcanic rocks assume increased importance, and constitute the leading features of the grape-growing region of Sonoma, Napa, Solano and Yolo counties, as well as, farther north, in Lake and adjoining portions of Colusa and Mendocino. Here the lower portions of the mountain sides are frequently constituted of the heavy tertiary and cretaceous materials which form adobe, while the upper portion consists of igneous rocks yielding lighter soils, often deeply colored with iron, and more especially adapted to fruit culture. The valley soils are, of course, a mixture of both, and it is on such composite soils that the enormous yields of from 12 to 14 tons of grapes per acre are sometimes obtained.

Of the soils of the mountainous regions of Mendocino and the country northward to the Oregon line, but few data have thus far been obtained. Specimens of valley soils, and especially of that of the El River, in Humboldt county, seem to show a great similarity to those of the coast valleys south of San Francisco bay. It is a gray silt with very little coarse sand, many feet in depth, with high percentage of potash and phosphates, but deficient in lime, and probably from that cause difficult to till, and somewhat unthrifty after continued cultivation. Southward of San Francisco bay, where with otherwise similar composition the lime percentage is large, this inconvenience is not observed, and these silty valley soils are remarkable for their retention of moisture near the surface throughout the dry season—a highly valuable property in the dry climate. Adobe soils are exceptional in the southern Coast Range region, gray loams or silts, or sometimes sandy soils,

being on the whole predominant in the uplands also. In the semi-tropic region of Los Angeles, San Bernardino and San Diego, the uplands or mesas which occupy the larger portion of the surface have usually a reddish, gravelly loam soil, more or less heavy in different localities, but on the whole remarkably uniform in its character. It seems to be a modification of the foothills soil northward of the Sierra San Fernando, but of greater depth, more easily tilled, and with higher percentage of plant food, especially of phosphates. Hence, though of the desolately arid aspect of a gravel bed in the dry season, these mesa lands when irrigated prove profusely fertile, and in spring are covered with a dense carpet of bright flowers. For fruits adapted to the climate, they are probably excelled by few so far as quality is concerned; although, on account of greater facility for irrigation, the lower levels and the terraces or benches along the streams have chiefly been occupied.

The soils of the Colorado River bottom is a light, pale-colored loam of great depth, highly calcareous, with over one per cent of potash, but a comparatively low amount of phosphates for a river bottom. It proves extremely fertile where cultivated.

The soils of the Mojave and Colorado deserts have received but little attention and examination thus far. While a portion of the surface is covered simply with drifting sand underlain by rock or hard pan, there are in the Mojave desert, at least, extensive tracts possessing a soil of fine gray silt, on which the yucca tree attains a luxuriant development; while others are covered with low but dense growth of hardy shrubs, and grass enough to render the spring pasture valuable and nutritious, while the sheep crop the leaves of shrubs later in the season. Plainly, a large portion of this desolate-looking country evidently reawaits only the life-giving influence of water to be at least available for stock-raising, and to no inconsiderable extent for cultivation also. The lower portions of the Colorado desert especially are so severely afflicted with alkali of a corrosive character that, being incapable of drainage on account of being below the sea level, their reclamation seems hopeless.

The Electric Light in Los Angeles.

The "Pueblo," now city of Los Angeles, has an area of six miles square, or thirty-six square miles. It has a population, now estimated, of 22,000, being an increase of 10,000 since 1880. It has been lighted with gas for about fifteen years, at an expense varying from \$3,000 to \$10,000 per annum. But the area of gas lighting comprised only a few of the main streets, less than two miles in length and a half mile in width, or one thirty-sixth of its area.

Last summer a proposition was made to supply the city with electric light (under the Brush patent), by means of masts, the lamps to be suspended at the top. By such method a large area can be illuminated, and not only the streets and alleys, but yards, areas and open spaces are lighted. This system is peculiarly adapted to towns where there are few high buildings or narrow streets, and a larger territory can be furnished with light than if placed on posts, and at a less cost than other methods. The electric company proposed to furnish seven masts, of 150 feet high from the ground, at which elevation there were to be placed on each mast three electric light are-lamps, of 3,000 candle power each. The price was \$1,000 per annum, each mast, or a total of \$7,000.

It was intended by the contractor that these masts should be placed within the space occupied by the gas lamps then burning. The gas company put in a bid for 165 lamps at \$6.85, or fifteen dollars less than the electric light bid. After a long consideration and much hesitancy, the council approved and adopted the electric light by a unanimous vote. In placing the masts, against the wishes of the contractor who wished them placed within the usual area of gas lighting (in order that the superiority over gas might be more apparent), all the masts, save two, were located outside the old area of gas lighting, and in two instances a mile beyond.

Taking the distance from the center mast on Main and Commercial, the mast in East Los Angeles is two miles, Boyle lights one and one third miles, Main and Sixth four fifths of a mile, First and Vine one half mile, First and Olive one half mile, Normal School hill four fifths of a mile, or comprising an area of nearly three miles long and one and one half miles wide, an inside area of four and one half square miles, as against the gas area of one mile. But as the masts throw a practicable light nearly a mile distant, the area lighted is more than ten square miles by electric light—over one square mile by gas at the same price.

Notwithstanding the immense area the masts were forced to supply, it is stated that the whole area of the city is practically lighted, and those portions in the vicinity of the masts very brilliantly—for at a distance of a quarter to a third of a mile from a mast one can perceive the time on the dial of a watch.

The light is particularly effective on wet, cloudy or foggy nights. The light seeming at such times to have more power than on clear nights, and it is a common saying that they "are the most effective, when needed the most." We are told that the lights have given general satisfaction to the citizens.

The lights were turned on the first of January, 1883, and after a test the City Council or-

dered every gas street-lamp discontinued, and the city is wholly lighted by electricity. The lamps are suspended on cages: these cages are lowered for trimming to the cross-trees. The masts are made of spars from Puget Sound. They are of two pieces being at about twenty inches in diameter at the ground and tapering to six inches at the top. They are very graceful and beautiful, and without a knot the whole distance. The light is turned on instantaneously over the whole city.

Among the many advantages of the mast system is the economy, as it would cost from five to ten times as much to light the same area with gas. There should be taken into consideration also its efficiency in "policing" the city, chief of police testifying that it aids the police wonderfully in watching and guarding against the criminal element.

Real estate, outside of old area of gas-lighting, has appreciated in value from benefits of the light. It is not an uncommon remark by residents in such localities, that they would be willing to pay an extra tax if needed rather than dispense with electric light and return to gas, but as it costs less no tax is needed.

Of over fifty letters addressed to the city officials and to prominent citizens, every one returned an emphatic endorsement to the efficiency of the electric lights, and their superiority over gas light. The press is equally emphatic. The *Herald* April 28th, in an editorial referring to the proposition to light San Francisco with electric light, says: "Under our system of electric illumination, the city proper is far more satisfactorily lighted than ever before, while the benefits to the people residing in the suburbs are simply incalculable. Though the masts placed at the head of First street, and near the Normal school, the illumination is so vivid that the Rev. Mr. Bovard, the Principal of the University of Southern California, can see to put up his horse evenings, though at a distance of three miles. We see by Tuesday's *Bulletin* that the California Electric Light Company has made a proposition to the Board of Supervisors in San Francisco to supply a section of that city with 200 Brush electric lamps, of an aggregate of 420,000 candle power, as against the present service of 1,700 street gas lamps of 27,900 candle power, and at a considerable saving in outlay at that. While the *Herald* does not presume to dictate to the municipal legislators of our metropolitan city, we think they will be very wise indeed to add to the illumination of San Francisco, while, at the same time, they curtail the expense of their illuminating service. As a chandelier over-shadows a farthing rush light, so do the Brush electric lamps douse the faint glimmer of the feeble and flickering street gas lamps of the old days. We have seen the contrast, and we speak advisedly."

The *Times* editorially says: "San Francisco has been in darkness for some time, so far as street lights have been concerned. From private sources it is learned that there is a sentiment largely in favor of the electric light, which will give a much better light for a great deal less money. The people of Los Angeles feel rich in having the light. Her streets are lighted as they never were before. More than four times the extent of territory is now lighted than under the old regime, and for about the same cost. There is no more growling and grumbling over the lighting of the streets, which used to form an ever ringing chorus. There is still a need of more masts, but the present system gives eminent satisfaction. A peculiarity of this light—and this feature is particularly dwelt upon by most of those who have expressed their opinion—is, that it shows to better advantage in wet or foggy weather than in bright clear weather. The darker or more foggy the weather, the better the light. In fact, it shines out strongest when most needed. The light can be especially recommended for San Francisco and other places on the bay where fogs are frequent."

The *Express* also concurs editorially as follows: "There is no place on the coast where the new light has been so thoroughly tested as in Los Angeles, and after several months the general verdict is in favor of electricity as the cheapest and most effective way of illumination yet found. If there are any of our citizens who differ from this view, we have not met them. There are seven masts in this city, costing \$1,000 each per year. These masts are so distributed that a large area of the town is lighted. From the masts on the higher grounds the light is cast to a distance of three miles with sufficient power to enable persons to dispense with lanterns in doing little chores around the home premises. This power of penetration causes the lights from all the masts to intermingle and overlap so that there is great evenness in the way the several parts of the city are lighted. So brilliant is the illumination even at considerable distances from the masts that windows where persons sleep require to be well curtained to shut out the rays. The same area could not be so well lighted by gas for four times the cost. Were the matter put to a popular vote in this city to-day the question as between gas and electric lights would be decided in favor of the latter by an overwhelming majority. The light is a success with us in every sense of the word."

EXTENSIVE mica beds are being found in Custer county, Dakota, of unsurpassed purity. This has become a large business, which is gradually assuming mammoth proportions. The demand for mica is increasing in proportion to any possible increase in the production. This branch of our mining industry is destined to become a very important one in the near future.

*From a report on the "Climatic and Agricultural Features of the Agricultural Lands of the Pacific Coast," by Prof. E. W. Hilgard.

MECHANICAL PROGRESS.

Hardening Taps and Dies.

A writer in the *Chicago Journal of Commerce* gives his experience in tempering as follows: The great difficulty in hardening tools is principally their liability to twist or get out of true; second, cracking (especially if large) after hardening; thirdly, getting the right temper. In our factory we use a great number of small taps and rimers; some of the rimers are nine inches long and a quarter of an inch in diameter; these we harden very successfully, not more than one out of a dozen being out of true. Our plan is as follows: First, carefully select your steel; let it be of the best cast, with a medium grain (a fine grained steel will break when much less force is applied than a coarser grained, and, although it will take a keener edge, it will not resist the strain required by a tap or rimer). Next center it, and turn off the scale and soften. The object of softening after the scale is removed, is to make the grain of the steel equal throughout; if it be softened with the scale on, it will generally cast. To soften, inclose the articles in a piece of gas tube, filling up with wrought iron turnings and plugging the ends with clay, making the whole red hot and allowing it to cool very slowly—i. e., leaving it in red hot ashes all night. This method makes the steel very soft, and equalizes the grain. After softening turn up the work, taking care not to bend it or straighten it, should it have cast, as it probably will in the process of softening. The reason for this is that, if the steel be bent or hammered, the grain will be closer in one place than another, and heat has a great tendency to bring it back to its original position. The next thing after finishing your tool is to harden it; first, slightly heat it over a gas or other flame, and rub it all over with a mixture of Castile soap and lampblack. This is to prevent the edges from being burnt. The next is to get a thick iron paper (the size we use is two inches diameter and three-fourths bore). This is well filled up with taps or rimers and charcoal dust, the ends being closed with clay as before. This is placed in the furnace and occasionally turned, until it is one uniform heat of cherry red, or on the outside a trifle hotter. It is then carefully removed from the fire, one end of the clay knocked off, and the contents allowed to drop perpendicularly into a solution of water, chloride of sodium and nitrate of iron; this is kept at a temperature of sixty degrees. The articles hardened should remain at least a quarter of an hour before being removed. This method of hardening may be summed up thus: Make the steel of one grain throughout, prevent it from oxidizing while being heated, allow every part to heat at the same time, avoid bending while hot, and lastly restore, if possible, by adding to the loss of carbon caused by heating. As I have taken up already too much of your valuable space, I will defer the method of tempering to some future time.

American Heavy Steel Forgings.

General Benet, Chief of Ordnance of the United States Army, has addressed a circular to a number of steel manufacturers of the United States, inquiring regarding their facilities for making the steel parts, of a certain specified quality, for the manufacture of the guns and mortars provided by the act of 1883 for the armament of fortifications. While there is no doubt that the quality required can be produced in this country, it may be questionable if forgings of the size required can be made, though this we cannot state positively, as we are not at present advised as to what the size, weight and shape of the pieces required are. The chief trouble appears to be that we have but very few hammers in this country that are heavy enough to forge the pieces that will be required. Some few, as Park, Bro. & Co., in Pittsburgh, and one or two other mills, are large enough. The Ordnance Department intends to make every effort to procure all the steel parts for guns, etc., from manufacturers in this country, if possible, and, with that end in view, will lend all proper encouragement and assistance to the firm, or firms, enterprising enough to take the matter in hand. Even if at the present time the heavier forgings cannot be obtained here, it is believed that at least steel hoops can be procured from some one of the many extensive tire rolling mills by a moderate outlay for the change of existing machinery.

PAPER RAILS AND CAR WHEELS.—In reply to a query in regard to an item in our issue of March 17, on paper rails, our correspondent will notice that the article was copied from and credited to the *Boston Journal of Commerce*, to which paper we refer him for the information he desires. Paper car wheels, so called, are far from being made exclusively of paper—such a wheel, however firmly made, would not carry a car fifty miles. What is called a "paper car wheel" is a paper center, with a steel tire. The "Allen paper car wheel" does remarkable service, but the wear all comes upon the steel tires. The paper centers to which they are bolted diminish the jarring by their elasticity, and are practically indestructible, because there is no wear on them, and they cannot be fractured like metal. Paper tires are absurd, and notwithstanding the endorsement of the *Boston Journal of Commerce* we believe that paper rails which somebody has said have been made and are to be put to actual use, are equally absurd.

The Brickwork of Chimneys, Etc.

In a communication to the *Deutsche Bauzeitung*, Herr Eckhartz has expressed his opinion that the cause of crevices being formed in the brickwork of chimneys, is the difference of temperature between the inner and outer surface. While in many cases in an ordinary factory chimney the mantel has internally a temperature of nearly 600° F., the external temperature is only about 60° on an average, the difference of expansion which is thus occasioned producing the cracks referred to. He dwells upon the use of iron hooping, and remarks that its object and result are not, strictly speaking, the prevention of expansion, but rather the attaining in the outer brickwork of a uniform distribution of the tension, and the prevention of concentration at certain points. The question whether wrought-iron rings in the inside of a mantel are liable by their own expansion to produce cracks has been for some time under discussion in German technical circles. A short time ago, Doctor Tomei recorded, in the journal above referred to, his opinion that the binding of chimneys by means of iron inside the masonry was a measure only to be recommended in exceptional cases, and with the observance of special care in its execution. He considered that the external binding of brickwork was, however, a question which was to be regarded in a different light. Herr Eckhartz, though not founding his remarks exactly on those of Dr. Tomei, further illustrates them by saying that if ironwork placed internally fails to prevent cracks, and even produces them, its employment in that way is not only superfluous, but injurious. If rightly constructed, he considers that for resisting the effects of the wind no hooping is required by a chimney. In further elucidation of the theory that internal hooping is unsuitable, he remarks that the ironwork should, as a matter of course, not be exposed to a high temperature; and he maintains that all rings inside masonry must, under these circumstances, be subjected to the influence of heat. If they have not sufficient space for their expansion they exercise a pressure upon the external brickwork, and thereby produce cracks. From the facts thus noted, Herr Eckhartz deduces the recommendation that in order to provide against the results of the difference in temperature to which allusion has been made, double walls should be constructed.

Steel Castings.

M. S. Kern, St. Petersburg, writes as follows on this subject: The process of manufacturing steel castings is very carefully kept secret at all works engaged in such a business throughout Europe. We have had several very interesting papers by M. Poullet, of Terrenoire, France, but he gives nearly nothing about the *modus operandi*. We understood well that a man is not expected to say everything about his method if it brings him pounds, shillings and pence. In Russia, very few steel castings were made at some works, and these may be called only experimental. We have lately received some information of a process of molding for steel castings, the invention of Mr. George Cowing. Quartz from Finland (a very pure specimen) was calcined, ground to rather fine powder, and mixed with from two to three per cent of glue, water and flour. This was used for molding. As a facing, fine quartz powder, with a small quantity of graphite well mixed with water, was used. The steel was prepared as follows: Eighty pounds of good iron, containing about .10 per cent of carbon (we propose to use soft basic steel) was melted in a crucible, and there were next added two pounds of silicon pig iron, containing 6.5 per cent of silicon and .5 pound of ferro-manganese, containing seventy-five per cent of manganese. The metal was kept in the furnace with the alloy for about fifteen minutes, and it was next poured into the molds. The castings had a very clean surface and were good. My opinion is that the clean surface depends much upon the molding material. There is certainly a reaction between the silica and the gases, and at the same time compresses the casting.

HIGH STEAM PRESSURE.—The economical advantage in the use of high steam pressures in steam engines results from two causes, independent of expansion. One, the minor cause, is that the potential energy of a given weight of steam is somewhat, though only slightly greater, at high pressures, compared with the heat required to produce such potential energy, than with low pressures. This is, however, only a trifling advantage, and not of the importance which is sometimes attached to it. The second cause, that the back pressure decreases relatively to the initial steam pressure as the latter is increased, the former remaining almost a constant within great ranges of initial steam pressure, is an important consideration in the use and economy of high steam pressure in engines. The resistance remaining in any special engine, almost a constant unit per square inch of piston area, the increase of initial steam pressure per square inch of piston area causes much loss from back pressure to be less as the size of cylinder decreases for the development of a given horse power. Independent of the expansion of steam at all, increase of steam pressure is synonymous with decrease of size of engine for the development of a given horse power.

SCIENTIFIC PROGRESS.

Notable Observations on Solar Radiation.

Prof. S. P. Langley, of the Allegheny Observatory, who made a scientific expedition to Mount Whitney, in Southern California, in 1881, to determine chiefly the value of the solar constant (that is the amount of heat the sun sends to the earth), and other related subjects, has been led incidentally to a number of curious and important conclusions respecting the influence of the atmosphere on the sun's rays. The observers noticed, as they ascended the mountain and the air grew colder, the sun's heat became progressively more intense, until their faces and hands, already browned by weeks of exposure, were burned anew, and far more in the cold than in the desert heat. When they had reached an elevation at which the surface temperature of the soil fell to the freezing point, the solar radiation became so intense that many of the party presented the appearance of having been burned by an actual fire; and near the summit the temperature in a copper vessel, over which were laid two sheets of plain window glass, rose above the boiling point, and "it was certain that we could boil water by the direct solar rays in such a vessel among the snow fields."

From this experience, the conclusion was justified that, were it not for the agency of the air in absorbing, storing and distributing the solar rays, the temperature of the earth's surface would fall very greatly, even though it received a much larger quantity of radiant heat from the sun. Prof. Langley expresses the opinion that without an atmosphere, the earth's temperature would fall fifty degrees below zero (Fahr.).

These observations also lead to other interesting inferences. "We see," says Prof. Langley, "if these results be true, that the temperature of a planet may, and not improbably does, depend far less upon its neighborhood or to remoteness from the sun, than upon the constitution of its gaseous envelope; and, indeed, it is hardly too much to say that we might approximately indicate the constitution of an atmosphere which would make Mercury a colder planet than the earth, or Neptune as warm and habitable a one."

THE PHOSPHORESCENT FLAME OF SULPHUR.

According to a German scientific journal, Herr Hennemann, having raised the question whether phosphorus among the metalloids was the only one which underwent slow combustion at a low temperature, becoming luminous, has answered it satisfactorily by experiment. He found that sulphur shows this phenomenon very well, though at a temperature higher than is required for phosphorus. If a heated rod of glass be dipped in pulverized sulphur, it becomes covered with the fused material which takes fire. If now the flame be blown out, the sulphur still continues to burn, but with a whitish flame visible distinctly only in the dark. The white phosphorescent light is seen much better when the sulphur is heated rapidly to 180° on a plate in the interior of a metallic air bath. White flames from three to four inches long flicker through the box, and by properly regulating the heat this slow combustion may be continued for an hour without the appearance of the blue flame. Various kinds of sulphur were tried, but in each case with the same result. Many compounds of sulphur act in the same way; thus cinnamon, antimonious sulphide, arsenious sulphide and others all show the white flame. The odor emitted when the sulphur thus burns is peculiar, recalling that of hydrogen persulphide, camphor and ozone, and is the odor generally ascribed to sulphur vapors.

PHOTOGRAPHING SOUND WAVES. Some interesting experiments relating to the photography of sound vibrations were recently made by the well known German chemist, Professor Boltzman. According to the method devised by him, a small thin platinum plate was fixed perpendicularly to the center of a thin iron tympanum like that of a telephone. Another platinum plate was fixed near the first so as to form a fine slit between them, and this slit was brought into the focus of a collecting lens upon which sunlight fell. After passing through the slit, the rays went to a selenium cell, which, with two telephones, was in circuit with twelve Leclanche cells. Single sounds spoken to the tympanum could be heard. When the rays, after traversing the slit, which varied in width with the vibrations, were rendered parallel and concentrated by a lens upon the selenium cell, the apparatus could be employed as a photophone. Intense sunlight concentrated upon the platinum plate by means of a solar microscope, and an image of the shadow of the platinum plate thrown upon a glass plate prepared with Vogel's emulsion, gave a photograph of the sound vibrations when the prepared plate was rapidly moved in a direction perpendicular to the line of light. It appears that for the vowel sounds the curves produced were simple, while those of the consonants were complex, those for *t, m, n, c, p* and *k* resembling the curves formed by König for "e" by his sound flames.

A new kind of alum, under the name of double alum, has been introduced in the German trade. It is a transparent sulphate of alumina, but has a larger proportion of the latter than usual, and is free from iron and acids.

FREEZING OF LIQUIDS IN LIVING VEGETABLE TISSUE. As is well known, there is a prevalent opinion that the liquid in vegetable tissues congeals as ordinary liquids do, and, expanding, often causes trees to burst with an explosive sound. Experiments on young and vigorous trees varying from 1 foot to 3 feet in diameter, demonstrated that in no instance was there the slightest tendency to expand. In the case of a maple, 3 feet 11 inches in circumference, there appeared to be a contraction of $\frac{1}{2}$ inch. In dead wood soaked with water there was an evident expansion, and the cleavage with explosion, noted in the case of forest trees in high northern regions, may result from the freezing of liquid in the center or less vital parts of the trunks. In some hardy succulents, however, instead of expansion under frost, there was a marked contraction. The joints or sections of stems in many species shrink remarkably with the lowering of the temperature, so that the whole surface in winter is very much wrinkled. Assuming as a fact that the liquids in plant which are known to endure frost without injury did not congeal, it might be a question as to what power enabled this successful resistance. It was probably a vital power, for the sap of plants, after it was drawn from them, congealed easily. In the large maple tree already referred to, the juices not solidified in the tree exuded from the wounded portion and then froze, hanging from the trees as icicles, often six inches long.

AN ARTIFICIAL AURORA. A telegram has been received by the Finnish Academy of Sciences from Professor S. Lemström, chief of the Finnish Meteorological Observatory at Sodankylä. He states that having placed a galvanic battery with conductors, covering an area of 900 square metres, on the hill of Oatunturi, he found the cone to be generally surrounded by a halo, yellow-white in color, which faintly but perfectly yields the spectrum of the aurora borealis. This, he states, furnishes a direct proof of the electrical nature of the aurora, and opens a new field in the study of the physical condition of the earth. A further telegram has been received, in which Professor Lemström states that experiment, with the aurora borealis made December 29, in Enare, near Kaitaka, on the hill of Pietarinturi, confirm the results of those at Oatunturi. On that date a straight beam of aurora was seen over the galvanic apparatus. It also appears from the magnetic observations that the terrestrial current ceases below the aurora, while the atmospheric current rapidly increases, but depends on the area of the galvanic apparatus, to which it seems to be proportional. The Professor regrets that with the means at his disposal further experiments cannot be made, and that he intended almost immediately to withdraw the apparatus.

A NEW METHOD OF DETERMINING THE GRAVITY OF SOLIDS. Prof. Munroe having occasion to ascertain on shipboard the specific gravities of samples of coal, and being prevented by the motion of the vessel from using the balance, devised a procedure which not merely served his purpose, but is susceptible of wide application. Placing a block of coal in a liquid so dense as to float it, he gradually reduced the density by the admixture of a lighter liquid, until the coal floated immersed. The homogeneity of the mixture being maintained by stirring, this equilibrium was, of course, reached only when the specific gravity of the liquid became equal to that of the immersed solid. He then measured the specific gravity of the liquid with a common hydrometer. For the location of the lighter solids he used a thick solution of cane sugar; for anthracite, strong sulphuric acid. As a test of the accuracy of the results, he afterward repeated the determinations by the usual methods, with but smallest fractions of difference.

INFLUENCE OF ANIMALS IN PREVENTING OR CONTROLLING FOREST GROWTH. A correspondent, writing from Johnstonville, S. C., incidentally mentions a curious instance of the influence of animals in controlling or preventing forest growths. It appears that the fondness of hogs for the juicy roots of young pines leads them to seek them assiduously, so that where hogs are allowed to roam in that region one can hardly find a young long leafed pine in a thousand acres of pine forest. There being no young trees to take the place of the old ones used up by the lumbermen and the porcine marauders, this species of pine is disappearing.

GALVANI ANTICIPATED.—Prof. S. Thompson, according to the *Journal of Science*, has pointed out the little-known fact that Swammerdam anticipated the famous initial experiment of Galvani by more than 100 years. Being on a visit in Tuscany in 1678, the illustrious Dutch naturalist showed to the Grand Duke that when a portion of the muscle of a frog's leg, hanging by a thread of nerve, bound with copper wire, was held over a copper support, so that both nerve and wire touch the copper, the muscle is at once contracted.

THE ELECTRICAL RESISTANCE OF TEMPERED GLASS. Some interesting experiments concerning the above subject were recently made by M. G. Foussereau, showing that the electrical resistance of glass diminishes considerably on being tempered. On the other hand, annealing tempered glass was found to restore its higher resistance. The same may be said of tempered crystal. The resistance of glass, tempered or untempered, provided the glass is not unduly heated, is found to remain constant.

up and worked. The water privilege of this mine is the best in the district, and would fully supply power the year round for any number of stamps that might be required.

San Bernardino.

CHALMER.—Calico Print, May 5: This promising claim, located not far south of the Silver Odessa, is owned by Messrs. J. H. McCutcheon and Dickinson. For over six months they have been prospecting and working the same. The indications have been good from the start. A tunnel was driven in 70 ft, but they have not yet struck the main ledge. There seem to be several ledges on the claim, from which assays have been taken that show well. The most encouraging prospect is seen in a shaft that is being sunk in the mouth of the tunnel, which is 15 ft deep and 35 ft from the surface to the bottom.

BORAX CLAIM. About half a mile east of the Garfield, Mrs. Townsend has two men at work on a claim called the Lady Blanch, from which they are taking borax and sending it.

LYON.—Messrs. Miller and McBride have several men at work on this claim, which is showing up well. A tunnel has been driven in on the east, and also one on the west side of the hill, and soon they will meet in the center of the ledge, when they will commence stoping.

SILVER ODESSA.—The work on this fine claim still progresses. The roar of the ore cars ascending and descending the chute, and the loud reports of blasts can be heard at the mine at all hours of the day. The average quantity of fine ore increases instead of diminishing. The work of tearing down the bluff continues. The ore lies in pockets. Sometimes they will be taking out ore from a place that is exceedingly rich, and again will strike a spot that contains only waste rock and very low grade ore; but the average quantity of good ore continues to increase, and no symptoms of its failing can be seen.

GOBLER.—The appearance of this claim has changed considerably. There are 16 men at work in two places on the east side of the mine. The bluff on the west side of the canyon is being blasted and cut away, opening large veins from which eight tons of good ore was taken daily to the mill. The whole bluff contains ore, and numerous veins have been opened; but there is a large vein, seemingly the principal one, running a long distance through the vein from northwest to southeast. It is several feet in width, and in some places spreads out into pockets from which considerable rich ore is taken.

OCCIDENTAL.—A large quantity of rich ore has been taken out, and an immense body laid bare in the cuts and tunnel. This mine is developing into a bonanza.

ORIENTAL.—Hoisting works have been put up on this well known mine, and every facility for getting out the ore is being made. The usual quantity of good ore is being taken out daily.

SILVER KING.—Work in all the levels of this principal mine of Calico is progressing in good shape. The ore bodies that have been penetrated are showing up better than ever. Nadeau's ore teams are still hauling ore to the Oro Grande mill which yields rich returns in bullion every week.

ALHAMBRA.—There are eight men at work making improvements, and when they are completed the mine will be in a condition to yield an immense quantity of ore. A large quantity of ore has already been taken out and milled by the former owners with most satisfactory results. John McBride is foreman of the mine.

Sierra.

A RICH STRIKE.—Sierra Tribune: A very favorable strike was made on what is known as the Page ledge, located in Sailor ravine, last week. J. Cowden, one of the owners, brought down samples of quartz that showed free gold in abundance, and reported that an ore body had been encountered that had every indication of proving permanent and rich.

A FINE PROSPECT.—The Bald Mountain Extension Co. encountered the channel on the South Fork ground at Forest City this week. Eighteen carloads of gravel taken out and washed paid \$2 per load. As was stated in these columns a couple of weeks ago, the South Fork mine has been leased by the former company. The Extension owners are quite jubilant over the early strike made, and express the belief that the course of the channel is proof positive that it will find its way into their ground eventually.

FOREST CITY.—Lumber is being delivered daily at Forest City from the various saw mills in that vicinity, for parties who will rebuild on the burned district. Quite a number of buildings are already under headway, and, in the course of three or four months, it is quite sure that no evidence of the great fire will remain. The recent developments in the Bald Mountain mine have given the people there new courage, and it is stated that the prospects for a prosperous season are flattering.

Shasta.

MAD OX.—Shasta Courier, May 7: The Mad Ox mill does good work with water power, but when the new steam machinery is placed in position the old Mad Ox hills will resound with the lively pounding of the stamps. We understand that the mine is turning out splendid ore, and lots of it. If old man Peckham, the locator of that mine, could have realized how rich it was he would not have sold out for \$4,000.

FROM FURNACEVILLE.—Cor. Redding Independent, May 3: The mines, outside of the Afterthought, in this district are doing but little work, though several claims are owned and represented here. The Afterthought has had several set-backs, such as storms, freshets and freezing, and the procuring of necessary supplies, and have therefore met with several detentions, and would have to shut down for a while; and then there is not the necessary number of pans, leachers, agitators, etc., to keep the stamps running all the time; but for all that a large amount of ore has been run through, and the bullion—copper and silver—is of very good appearance. Mr. Stewart, the superintendent, is well satisfied with the process, if he can keep all the stamps running, that he can soon make the mine pay dividends. Most of the ore now being taken from the mine looks well and assays well. Several shipments of silver and copper bricks, below, have made excellent returns, quite satisfactory to Mr. Stewart. There are employed in and about the mill and mine about 25 men, who receive their wages regularly; that, though,

has been a noted fact in the district, that the hands always have received their pay in full, although several failures have occurred in making the mines pay heretofore by different processes than the present one.

Tuolumne.

WASTING.—Tuolumne Independent, May 5: Charley Seaver is washing away the place in the rear of his residence at Springfield, and it pays well. In early days Springfield Flat and all about the town swarmed with miners who made large wages in washing the surface. Down among the boulders are many rich spots difficult to get at, but which will some day reward the lucky man who finds them.

NEVADA.

Washoe District.

HALE & NORROSS.—Enterprise, May 5: The north drift on the ore streaks has been discontinued at a distance of 78 ft from the main north drift, and a cross drift has been started east to a point under the winze, down from the 2400 level.

SIERRA NEVADA.—Good headway is making in the north lateral drift on the 2600 level. Some ore of a fair milling quality is being taken out of north drift No. 2 on the 2600. This streak appears to be the top of a body of ore which will be found to lie in the level below.

CHOLLAR.—The indications are that crosscut A, on the 2600 level, will find a considerable body of good ore. It has already cut a seam of some 15 inches in width of very fair ore, though it has yet a considerable distance to go to reach the point where it was expected that it would cut the ore streaks followed south 65 ft by the Hale & Norross.

UNION CON.—The winze chamber at the end of the joint Sierra Nevada crosscut on the 2600 level is completed, and the winze started for the 3100 level.

CON VIRGINIA.—On the 2500 level work has been discontinued in the face of the southeast drift in order to allow the hot water to drain out at the face. On the 2700 level drain boxes are being put in.

OHMER.—Good progress is making in cleaning out and repairing the old Central tunnel. A considerable amount of ore is being taken out at the croppings.

MEXICAN.—The joint Ophir east crosscut on the 3100 level is being extended at the rate of about 30 ft per week. It is now passing into softer or more favorable material.

UTAH.—The leak in the pipe in the drift passing through Sierra Nevada ground has been found and repaired. In order to reach the end of the drift without cleaning out its whole length a cross drift and upraise are now being made from the level below.

CALIFORNIA.—The C. & C. winze, which is to go to the 2900 level, is progressing well, and the south drift with which the winze will connect is being pushed ahead as rapidly as possible.

BEST & BELCHER.—The northeast drift on the 2505 level is cutting occasional streaks and bunches of quartz that give low assays. The ground is of very favorable appearance.

ANDES.—The north drift continues in quartz of a fine appearance, but it shows very little metal. The west drift from the raise is in better material.

ALTA.—Good progress is making in the drain drift, work being driven at both ends. The rock continues favorable, though somewhat hard.

Bernice District.

GOLDEN CROWN.—Silver State, May 2: A loveable correspondent, who has just returned from Bernice, writes as follows about the district: "The Golden Crown mine, owned by Wallace Goodell, is looking well, and there are several fine prospects in the vicinity of that mine. Hoyt & Gilbert have been opening up their mine lately and have a large quantity of good ore in sight. James Denney sold a half interest in his mine to Austin men, who are going to work to develop it immediately. G. W. Bothwell has quite a force of men at work erecting his mill, which is expected to be in running order about the 1st of July, by which time there will be ore enough on the dumps and in sight in the several mines to keep it running steadily. The people of Bernice suffer great inconvenience from lack of mail facilities, but they have hopes of getting a mail line established to the camp ere long."

Cherry Creek District.

MILL.—White Pine News, May 5: The whistle of the Exchange mill is now music to the ear. The Exchange people are putting through some good ore, and we learn they have quite a large amount of the same kind out and in sight.

Crabb District.

ORE.—Cor. Esmeralda Herald, May 3: The Plummer Bros. have run 9½ tons of ore from their mine through the mill at this place, which worked over \$20 per ton. They talk of hauling over 30 tons more that they have out and working it. The mill, it is expected, will start up on ore from the Eagle Bird mine about the middle of May. Plummer Bros. think the ore they have on the dump is better than what they worked.

Columbus District.

NORTHERN BELLE.—True Picture, May 5: There is a material improvement on the fourth shaft level, both in the stope and in the main drift. Some fine ore is being extracted from the winze below the second shaft level, and the stopes above the first shaft level are yielding as usual. There is quite an improvement in the eastern end of the ninth level, and some ore of excellent grade is being taken from that part of the mine. Everything in and about the mine is progressing in a satisfactory manner. Both mills are running steadily and doing good work. The Bullion shipments amounted to \$12,662.44 for the week ending May 3d, and to a total for the month of April of \$88,309.01.

MOUNT DIABLO.—The stope below the third level, near winze No. 4, is giving a little \$220 chloride. The intermediate stope, between the second and third levels, and nearly above winze No. 1, is yielding a small amount of \$200 ore. The stope from the east drift on the second level has given considerable \$70 ore. The stope above the west drift from the Callison winze is looking much the same as at the date of last report; the west end shows two feet of \$75 ore; the center of the stope shows 8 or 10 inches of \$80 ore. The west intermediate, below the first level, is turning out considerable \$70 ore. A bullion shipment was made on April 26th, amounting to

\$5,624.58, and another on the 30th valued at \$7,735.13. The total shipments on April account were \$91,200.08, and one of \$5,681.06 on May 3d.

Kinsley District.

COPPER.—Elko Independent, May 5: Gen. John B. Clark and A. C. Harner, Jr., arrived on this morning's train from the East. Mr. Harner is a son of the President of the newly-organized company in Philadelphia, which purchased from Ben. Fitch the series of copper mines in Kinsley district, in this county. He will act as superintendent, and active operations for the development of the property will be commenced immediately, or as soon as the weather will permit.

Taylor District.

SALES.—Ward Reflex, May 5: Taylor district takes the lead in saleable mining property just now, and justly so. It appears to be no trouble at all to sell a mining claim over there at a good figure.

Tuscarora District.

ELKO CON.—Times-Review, May 6: During the past week drift No. 3 has been advanced six feet through an unusually hard formation; total length, 89 ft. The ledge continues to produce a fine quality of chloride ore.

GRAND PRIZE.—West drift on hanging wall is in 56 ft, and the upraise east of the shaft on the 500 level is up 32 ft.

ARGENTA.—Drift from winze is in 87 ft. Have stopes opened a distance of 40 ft, all in good ore. Repairs on mill are being made as rapidly as the nature of the work permits. Pay roll for April, \$4,029.75.

NAVAJO.—The stopes are producing the usual grade and quantity of ore. Last Monday shipped \$14,233.43, making a total for the month of April of \$83,879.93.

NORTH BELLE ISLE.—South drift has been advanced 34 ft during the past week. East crosscut was advanced 9 ft through exceedingly hard formation, showing small seams of ore.

White Pine District.

HAMILTON NOTES.—White Pine News, May 5: The present weather is a great drawback to mining operations in this section. The Sweetwater Co. is prevented from hauling ore to their mill, owing to the bad condition of the roads.

ARIZONA.

NOTES.—Tombstone Epitaph, May 5: The Lima Con. has determined to let a contract for a further 200 ft in the main shaft, so that with the work being carried forward in the tunnel the work of development goes bravely on.

THE WATERVALE MILL.—Everything at this place is running smoothly, and the stamps are kept constantly running on ore from the Rattlesnake mine, the output of bullion from which shows no diminution. Quite a number of improvements have been made here in the shape of pans and settlers, and there is no doubt but that a further five stamps will shortly be added.

PEDRO CON.—The tunnel is now in 300 ft, in prosecuting which work many seams of ore have been cut through. The main ledge, which is the object in view, will not, it is calculated, be struck for possibly 130 or 150 ft yet.

CHARLES ANSHUTZ. from Bisbee, came in to town to-day. He reports everything booming in the copper camp, with plenty of inquiries for good properties.

THE Silver Bear. at Bisbee, it is said will shortly start up with a full force of men, which will add to the already prosperous condition of this happy camp. Our friend Percy Thompson continues superintendent.

It is with pleasure that we announce the settlement, by a friendly compromise, of the lawsuit of the Satisfaction and Atlanta mining claims at Bisbee. The terms are hard on the innocent purchasers, but, nevertheless, a bad compromise is always better than a costly lawsuit. Work will be at once commenced on the Atlanta, and before long, should the development warrant, the erection of smelters will be carried out, and another bullion producer at Bisbee will soon be heard of.

NOTES.—Arizona Miner, May 4: The Copper Mountain smelter, of Messrs. Stoddard & Co., is up and ready to commence operations as soon as coke for the furnace arrives on the ground, which will be within three or four days. The Copperopolis Co., of Castle creek, better known as the Colyer Co., has a smelter on the ground ready to put up and commence operations. Mr. Klein, President of the company, is at Castle creek looking after the business in person. The Holms mine has at last changed hands, and Mr. H. has received his \$135,000 in cash from Mr. Rodebush for the same. Out in the Black Hills Gov. Tridell and his company are busy preparing for machinery, which is about to be erected for the treatment of copper and silver ores. At Tiptop the new hoisting works are being put up, and soon developments in the mine will commence, and the Gillett mill will start up. On Cape creek, Maricopa county, a great deal of work is being done, and good properties coming to the front. On Turkey creek considerable ore is being taken from the mines and shipped to the Howell smelter on Lynx creek. The Howell smelter has proved a grand success, and a great deal of bullion is being produced which will soon be shipped east. From Mohave county we have flattering reports of big strikes and good sales of mining property.

TODD BASIN.—Mohave County Miner, May 4: The great Wallapai district is divided into a number of sub-districts, each represented by its little mining camp and its particular set of miners. As a rule the inhabitants of these camps are firm believers in their own camps, and will argue by the hour on its distinctive merits, and claim that their mines are the best and that that particular portion of the Wallapai district in which they live is the best and richest. In no case is this spirit more marked than in the sub-district commonly called Todd basin, and in which we will include the neighboring basins, called respectively Bobtail and Union. The miners who own most of the claims in the vicinity of these three basins have a right to brag about them for many reasons, though the simple fact that the rich ores produced here have supported some of them for the past 10 or 12 years, even with the exorbitant milling charges and the corresponding high prices charged for merchandise, should be reason enough.

COLORADO.

IDAHIO SPRINGS NOTES.—Georgetown Courier, May 3: Work is being vigorously proceeded with on the East Hukill lode. Mr. Ward states that his placer is yielding at the rate of \$400 to the man per day. Colonel Sandilge has sold one quarter of his Squirrel Gulch mining property for \$5,000. About 40 men are being employed on the Lone Tree mine and in the Bullion Smelter at Fredland. Work is to be resumed upon the Edgar mine. A contract to run 200 feet on the second level has been let. J. S. Sanderson, Esq., has leased the Cecil mine on Ute creek, to Mr. Stahl, of Denver. Work will be immediately commenced. Mr. Sanderson owner of the Wallace lode, is grading a road from his mine to Fredland, connected with the Spring Gulch road. He has ten men employed. The Robinson and Donaldson Co. are making regular and daily shipments from the Champion mine. The lower levels are producing smeltering ore that mills from \$100 to \$300 per ton. The main shaft is to be sunk an additional 150 feet. It is now 600 feet deep. The Red Elephant company's properties are producing more, and looking better than for several years past. 110 tons of fine ore was mined last month. The Swartz shaft is being sunk an additional 100 feet, which will make its depth 550 feet—the deepest workings on the mountain; 60 odd men are employed in the mine.

IDAHO.

EXTENSIVE COAL DEPOSIT.—Idaho Statesman, May 2: Mr. A. L. Rinearson returned here from his coal interests near Horseshoe bend. He informs us that there have been 480 acres of coal lands located in that vicinity recently, the locators being himself and Messrs. Miner and Stone. Two veins have been discovered, one of three and the other five feet in width. The position of the veins is nearly horizontal. Much excitement prevails, and locations are being rapidly made.

BOOMING.—Judge Heath, of Atlanta, made us a pleasant call Tuesday. The Judge has very valuable mining interests in Atlanta, and will return there as soon as the season is a little further advanced. He says that he and other old timers who have long clung to Atlanta with a faith in the future, built upon a certain knowledge of the rich resources of the camp, are themselves astonished at the recent developments and big results in the mines. The long period of promise and speculation is past, and the time of fruition and realization has come.

MONTANA.

THE ANACONDA SMELTER.—Butte Miner, May 7: It was reported on the street yesterday that the location on Warm Springs creek had been definitely decided upon for the site of the Anaconda smelter, and that operations will be commenced immediately for the erection of works there, but it is questionable whether the location has yet been fully determined upon. It is known that within the past two days surveys have been made for a site on the bench between the Blacktail and Suprenant's arastra, about eight miles southeast of this city. It was stated that, although the facilities for securing limestone, magnetic or hematite iron and fuel at this point were excellent, the difficulty of getting water would prove an insuperable objection to its final selection as the site for the smelter. It is also known that subsequent surveys show that water from the Blacktail could be obtained in abundance, by constructing a three-mile ditch. It is not reasonable to suppose that so eligible a site would be abandoned for one possessing so few advantages as the proposed Warm Springs creek location, unless some special inducements were offered in the way of land grants or special railroad rates, and it is not believed that any such special inducements have as yet been brought to bear upon Messrs. Haggis & Tevis to influence their final selection of a site for the smelter.

NEW MEXICO.

IRON KING.—Southwest Sentinel, May 2: The Iron King and 81 mines are undergoing rapid development. The ore is being hauled to the Magruder smelter under a contract, and each successive ton seems to be improving. Messrs. Magruder, Crawford and Higbee purchased of Messrs. Hutchison, Cassidy and Parker, and others, the ores which will be run through the new smelter at San Jose. An enormous mass of ore is now corded up around the smelter, and more is being added each day. The engine will be fired up in a few days and the smelter running in full blast, with sufficient ore to feed it for a long time to come.

ALMON.—Judge Potter and Mr. Johnson, owners of the Almon mine at Hanover, are now negotiating for the sale of 1,000 tons of ore they have already on the dump. It is copper property, and is considered a mine of great value. The average run of the ore extracted is 15¢. Considering the cheapness with which the mine can be worked, and the excellent facilities for smelting it, both seller and purchaser will make handsome profits. The owners of the Guyanaden copper mine, same district, intend letting a contract this week to sink 30 ft deeper. This property was purchased by Messrs. Reed & McDonald, Chicago mining brokers, when they immediately organized a large company to open it up and put machinery upon the works.

THICKET.—Sam Eckstein, one of the lucky owners of the Thicket mine, is happy. This valuable piece of property is only three miles north of the New Strike. He is down 80 ft on it, and has been rewarded by finding horn silver in large quantities. Specimens of the ore at his place of business are equally as good as anything yet unearthed in the great Bonanza.

MR. BALBACK., superintendent of the Glorieta M. Co., has met with some agreeable surprises in his development work on the Micawber mine at Clifton. From samples assayed under his direction in Silver City the results show a wonderful change in the character of ore. Looking for copper they follow the lead and find a large per cent in gold and silver. The average from a two-foot vein gives \$27.90 in gold; the average from an eight-foot quartz, good and poor, gives \$13.64 in silver; this was from a shaft 52 ft deep, and, as they progressed, when at a depth of 60 ft, the men superintending the contract telegraphed them on Saturday they had struck horn silver. This has given a new impetus to the mines in that locality and will be exceedingly encouraging to the owners. Gold has been found in the vicinity as well as silver, but copper has been so far the most worked and the most looked for. With this new development the Glorieta Co. will show some valuable property.

Peter Cooper.

How strange it is that we never fully recognize the worth of a great, noble nature while among us. It is only after he has gone that we begin to say, one to another, what manner of man is this who walked and communed with us by the way. It is the old illusion of what is present and familiar. The heart fails to realize how precious are its jewels until they are lost. Future generations build the sepulcher of the prophets, and do honor to their name. Peter Cooper works of love and charity fell upon the eager, money-making, giddy people of New York as a gentle rain upon the grass. Now they begin to realize how far-reaching and permanent are his beneficent deeds. Endurance is the only true test of a noble character, and Peter Cooper will be remembered in New York long after her Astors, Vanderbilts, Stewarts, and Goulds are spectral names.

His long, busy, thrifty career is a fine commentary on the law of patient, productive industry. There were hundreds all around him in those early days, as now, who sought to sprout fortunes in hothouse ventures. Mr. Cooper never ran after wildcat speculations. He threw no money into the lottery wheel of chance. He believed that wealth could be had, without making other people poorer. That a dollar judiciously planted would grow a harvest. At seventeen years of age he began the struggle as an apprentice in a carriage shop on \$25 a year and board; and by zeal and diligence won the confidence of his employers. At twenty-one years of age we catch sight of him in a woolen factory on Long Island working at \$1.50 per day. While here he invented a machine for shearing nap from cloth. It was patented, and for a short time had a rapid sale, and put a little money into his pocket. With this he opened a furniture store at Newburg, where his parents lived, which he kept for a short time, and then returned to New York and opened a grocery store. Hearing that an old run-down glue factory was for sale, he purchased it for \$2,000. He was now permanently established in business. It proved the source of the great bulk of Mr. Cooper's fortune. For many years he carried on the business alone, had no book-keeper, no clerk, no agent, no salesman. At break of day he was at the factory starting the fires and preparing for work. At noon he drove down into the city and made his sales. His evenings were spent posting his books, attending to his correspondence, and enjoying the society of his wife. This was his daily routine for nearly thirty years. His money swarmed, and at the age of fifty-five we find him owning rolling mills and iron works at Baltimore, Trenton, New York, Phillipsburg and Williamsburg, giving employment to 2,500 men. Through economy, sagacity and patience, his immense fortune had grown as naturally as the trees grow.

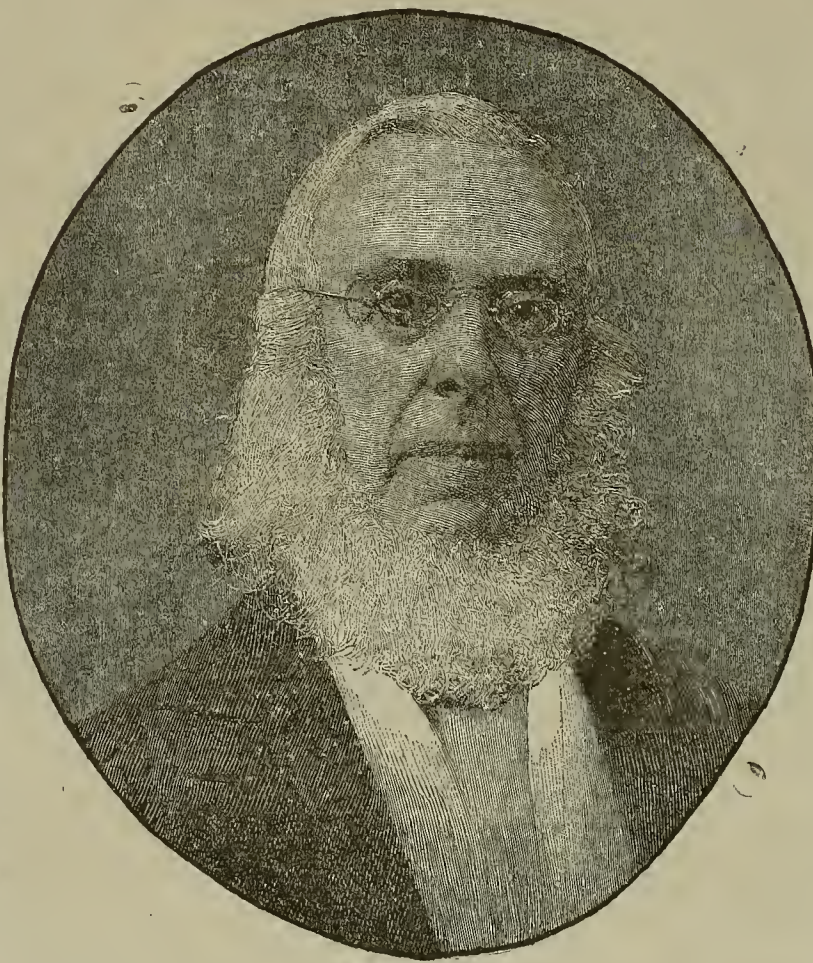
Peter Cooper entered New York with only ten dollars in his pocket. Jay Gould found himself on Broadway with only a patent mouse-trap to begin business. Alone among strangers both resolved to make a fortune. Both succeeded. There is nothing remarkable in all this. New York is full of rich men, who started life as poor as they. The fact is, acquisitiveness is an instinct, and is almost sure to lead to success when the environments are propitious. It is the motive which animated these two men with which we are now concerned. Gould sought for wealth, because it was a scepter of power that awed courts, legislatures, and levied at its own caprice tribute upon the earnings of the people. Here they part company. Mr. Cooper, while an apprentice in a carriage shop and spending his scanty earnings on the teacher of an evening school, determined to devote his years to the accumulation of wealth that he might found an institution where poor working boys and girls might acquire a free education in the prac-

tical arts and sciences. It was forty years before he was able to give definite shape to that idea. But he never forgot it. It gave unity, method, aim, and inspiration to his long years of toil. While carding wool at Hempstead, selling sugar, salt, and fish, at the Bowery grocery, making glue and isinglass at the Old Middle Road Glue Factory, building the first locomotive in America at his Baltimore Iron Works, or manufacturing the first railroad iron in this country at Trenton, during all these busy years, the founding of that school shone like a day-star in his thoughts. At last the time came to realize the beautiful dream of his life. About twenty-five years ago the foundation of the Cooper Union was laid. It was five years before the building was finished. It is a brownstone and iron structure, thoroughly fire-proof, of massive Roman architecture, an irregular quadrangle in shape, having dimensions on its four sides of 90, 146, 165, and 195 feet, and costing \$964,000; exclusive of the institution an addi-

tion has cost \$700,000. Of the splendid success of the institution in supplying the want which it was intended to meet, a recent annual report of the curator gave ample evidence. Every department was full to overflowing. More than 3,000 pupils has entered the various classes. Between 400 and 500 applications has been put on file to await the retirement of those who already held places in the classes. The instruction and lectures which these pupils enjoyed were given to them absolutely without charge. It is not easy to realize the far-reaching and beneficent influence of such an institution. In the twenty years of its operation, it has transferred the lives of thousands of youths from the unproductive and servile employment to which they would have certainly fallen, into the higher plane of intelligent, skilled artisans and original designers in the workshops and schools of the country. It can point throughout the land to miners, engineers, architects, builders, telegraphers, photographers and teachers; even professors in the higher departments of science who have been indebted to it for their success in life. Stephen Girard, ungracious in manner, ill tempered, miserly lived and died without

Stored Energy.

The useful development of electricity is one of the chief marvels of our age. Ever since it slid down from the sky on a kit



PETER COOPER.

string, and learned to respect houses and barns armed with lightning rods, there went abroad an impression that this mighty force could be caught, tamed and harnessed to a great variety of important uses. This expectation has been fully realized. It has been turned into medicine and liver pads, and at a touch of the finger flashes human thought across mountains and under the sea. Within a few years it has been taught to carry the very words, accent and tones of the speaker's voice. It writes for us, rings bells, strikes the time in electric clocks, warns a whole city of the locality of a fire, and floods the streets with a warm, brilliant and beautiful light. But the great trouble has been to manufacture and store it away, as water in a tank, or gas in a reservoir, in short barrel it up and keep it on draught. It is such a sly, subtle, potent energy. But within a year or two past even this marvelous feat has been accomplished. Sir Wm. Thomson's experiment with the Faure accumulator, sent him from Paris to Glasgow, gives perfect assurance that it will not be long till electricity is boxed, barreled and bottled, and shipped all over the world as an article of merchandise.

But in this invention, as in all others, man has only caught a hint from nature. Though to a superficial eye she may seem very prodigal of her energies, the fact is she is very economical and allows no waste. We may feel a little surprised to read that Faure's battery held "a million of foot pounds," yet a pound of coal contains energy equal to eleven million foot pounds. Every drop of water is said to hold lightning enough to kill a man, and in that case a tumblerful is a condensed thunderstorm. The sun pours his beams lavishly upon the earth. Much is radiated, but the earth like a prudent housekeeper, stores the most of it away for future use. It is packed in seeds, garnered in bulbs, blushes in flowers, and comes out in the flavor of fruits. Even cucumbers and radishes are full of sunshine, though it may take a digestive apparatus equal to a quartz-crushing machine to eliminate it. Nature is a careful banker and makes the most of her capital. Nature is generous, because she saves. What tremendous energy is stowed away in gun-cotton, powder, or glycerine. A dynamite bomb that a child could hold in its hand contains a small earthquake. A loaded gun or cannon is a fine sample of stored energy.

Thanks to Mr. Faure for the hint. Now for the application. A newspaper should be a sort of mental battery charged with wholesome ideas, valuable suggestions, a summary of the life and business of the city, a bulletin of the market, an epitome of the State, the nation, the world. It is a portable accumulator that the reader can stuff into his pocket, lay on his desk, or hang on a file until he has leisure enough to put his optic nerve and brain in contact with the magnetic currents of the world.

The sermon the reader listened to last Sunday was the stored energy of a week's elaboration, and if it lacked electric warmth, light and fire, it was because the preacher's brain battery worked badly or he tried to manufacture mental energy out of theological coke or the dust, slag and cinders of medieval theology. It may be that the conditions of the hearer were not good.

A fine physical constitution is a form of stored energy, sometimes inherited, but usually the result of wise and prudent care. For more than three months President Garfield fought death from a mortal wound, for the simple reason that the accumulated power of a sober, chaste and temperate life came to his help.

Good character is another form of stored energy. It is the accumulation of moral force, generated by a long, constant and steadfast resistance of evil temptation in every shape. It is the lack of this silent storage of power, that causes so many to break down the moment any great trust and responsibility are placed upon them. They are like hollow trees that are well shaped and apparently solid and vigorous, but are easily twisted, bent, and broken in a storm.

A CHEAP PAINT FOR FARM BUILDINGS.—Professor Knapp, of Iowa Agricultural College, says that experiments upon the college farm have decided in favor of the following preparation as a very excellent paint for outbuildings, and as far as tested it seems to answer all the conditions of more expensive paints: To three parts crude petroleum and one part linseed oil add sufficient mineral paint to give the desired body and apply with a brush. For better buildings white lead may be added in the proportion of one pound of lead to five of mineral paint. Crude petroleum costs only from six to eight cents per gallon by the barrel, and can be easily obtained through any druggist or dealer in oil in any town or village. A barrel would be handy to have in the house of any farmer, who could then do a world of painting at odd spells. Not only ought barns, fences, hog pens and stables to be painted, but the roofs and floors of these buildings as well.

A Curious Gold Mine.

There is up in Shasta county about ten miles northwest of Shasta city a mine belonging to private parties and now being worked in a small way, which is curious in several respects, there being no other like it, to our knowledge on this coast. It is called the Banghart mine, and has been worked more or less for the past seventeen years. It consists of a combination of claims, separately marked off to different owners. The ledge is in a mountain at the head of the Mad Mule creek, at an altitude of 3,800 feet. It is from 180 to 200 feet wide. The ledge formation is what is called birds-eye porphyry lying between well defined walls of black slate.

In early days Mad Mule Gulch was the richest gulch known in Shasta county. It paid very largely in coarse gold, some very fine large nuggets having been found. When worked out, the parties tried to find the source of the gold, but finally gave up the search no quartz ledges having been found.

Mr. Banghart was in the upper country, and heard of the coarse gold in the gulch. He thought he could find the source of the gold. He went to work diligently, but it was two years before he had any luck. He then discovered that there was a porphyry dike about 200 feet thick lying between slate walls; and this dike was traversed with seams carrying gold, wherever the seams came in contact with the slate walls, but nowhere else. The small seams are composed of magnesian, quartz sulphurets of iron, and they lie in all directions.

In the opinion of those who are working the mine, in the original cooling the porphyry shrank and cracks opened, and the heat from below forced this material up, and deposited it wherever it came in contact with the slate. If they go into the porphyry six inches they do not get any gold. It lies simply where these seams make the contact with the slate. Pieces have been taken out of some of these seams weighing twelve pounds. Last fall a piece weighing three and a half pounds was taken out with only traces of quartz. The gold is not found and taken out every day. They track a seam, and sometimes it will run 100 feet perfectly barren. It opens and closes. At some points it will be six inches in thickness, and contains quite a deposit of gold; then it will not be wider than a sheet of paper, but they keep on following it and it will swell out, and then comes another deposit. The lead has been traced seven miles. Some seams of porphyry are connected with the hanging wall, and pay well. On the hanging wall tons of sulphuret ore are found. The concentrated sulphurets from this run \$1,500 to the ton. The streak is about six inches wide.

This mine has been run by the present owners without any money. It took all they had to buy the mine, but it has paid its own expenses. Sometimes they take out two or three thousand dollars in an hour. It is all drifting work; they run a tunnel in until it strikes the slate, and then run along the slate. They do the same way on each side of the gulch. They dump into the gulch, and have no machinery. They have eighteen short tunnels, fifty feet or so apart. The slate comes to the surface. It is partly stoped out between the tunnels. These tunnels are run where they think they can get the best pay.

Last December, with one man, the streak being worked averaged \$80 a day right along, the largest piece taken out weighed nine ounces. The largest piece of gold ever taken out weighed eleven pounds. Some seams pay well and some very poorly—some only two or three dollars a day, others \$1,000 in an hour.

We were shown this week a box of very handsome specimens of pure gold in what is apparently a crystallized form. The little pocket from which this gold came yielded the other day eighty ounces, including what was shown us. There was no quartz attached to the gold at all. In fact it came out of a bunch of soft manganese, being scooped out with the hands.

The mine is perfectly dry, so no pumps are used, neither is there any timber used nor any hoisting done. The little tunnels which run in as far as the slate walls are run in on the side of the gulch, and the waste is dumped down into the gulch from the mouth of the tunnels. The tunnels are dug fifty feet apart and one somewhat above another. Drifts are run from the tunnels in the search for the seams, and the seams are stoped out.

Mad Mule Gulch yielded, when worked, \$1,000 a foot for three-quarters of a mile, and the gold evidently came from the source we have been describing. The mine is not systematically worked by any means, but is in a manner "coyoted" in the search for pockets. If all opened up properly, with means to do it, a different system would be inaugurated. The ore is pounded out with a spring pole and mortar. Over \$70,000 has been taken from the mine, no machinery having been used. An anastra and a mortar constituted the metallurgical implements. The specimen which took the first premium at the last Paris Exposition came from this mine. The mines of Transylvania, Hungary, as described by Ure, seem to be in a geological formation very similar to that in which this mine occurs.

USEFUL INFORMATION.

Difference Between Dry Rot and Worm Eaten Wood.

Dry rot is a term applied to damp wood under process of destruction by fungi, or low forms of vegetation. The albumen and the essential oils in the wood become the food of this secondary or parasitic vegetation; the woody tissue is broken up, and the walls of the cells destroyed, an earthy, powdery matter being left as the residue. This residue bears on its face a close resemblance to burnt or charred wood. Indeed, it is akin to burnt wood, for the albuminoids and the essential oils which escape under the influence and form the food of fire, have been consumed or absorbed by parasitic vegetation. The residue, an earthy, inflammable substance, is practically identical with that resulting from fire.

Dry rot, or the destruction of wood by secondary forms of vegetation, is dependent upon two conditions—heat and moisture. To prevent dry rot, the wood is dried or seasoned, by which one of the elements is withdrawn. To guard against the return of this one element, the wood is painted or varnished, and hence the general application of paint or varnish. Where wood can not be painted, preservatives are used, the object of which is to change the character of the wood, so far as its secretory matter is concerned. In this direction, creosoting is the most common or customary, the object of which is to poison the albuminoids and the essential oils, and so render them unfit for food to low or secondary forms of vegetable life. Salts, sodas and metallic injections have the same effect, but they are in a large degree soluble in water, and in course of time become weak or disappear, and consequently they are not so largely or generally used as creosote oil. The amount of moisture necessary for the support of this secondary vegetation is very large. This is supplied by humid or stagnant air, or by damp walls or subsoils, and hence it follows that wood subject to passing air, or brought under the influence of vegetation, is free from this disease or dissolution.

Worm eaten wood is wood injured by mechanical action—i. e., by animal life. The same conditions are imperative to the support of this form of life as to the above, but the amount of moisture necessary in this case is very small compared with that required for vegetation. Wood to be worm-eaten must be subject to damp, humid or stagnant air, and it must be a sweet wood, or the sap of a hitter or pungent wood. Ash, elm, walnut, birch, beech and lime-tree are sweet woods, and very subject to worms. Oak and resinous woods are bitter, pungent and unpalatable, and, except in the sap wood, are fairly free or proof against the attack of worms. Under certain conditions, as in the roofs of churches covered down with lead, where condensation of the atmosphere ensues, and the wood absorbs the moisture, the heart wood of even oak will fall a prey to the action of worms. In some cases the necessary moisture is supplied by the ends of the beams being inserted in walls, the materials of which are porous stone. Here the damp ends of the beams will be riddled with worms, and, sponge-like, they will crumble away, and if not supported will fall clear of the walls. The heart wood in this case seems to have lost its pungent qualities and to have become soft with long saturation; but, not having been seized upon by fungi, to still retain its albuminoids, and to be sufficiently endowed with them to form the food of worms.—*Furniture Gazette*.

TO MAKE LUMINOUS PAINT.—The following is a more concise method of making luminous paint than any which we have given before: Take oyster shells and clean them with water, put them into the fire for half an hour; at the end of that time take them out and let them cool. When quite cool pound them fine, and take away any gray parts, as they are of no use. Put the powder in a crucible in alternate layers with flour or sulphur. Put on the lid and cement with sand made into a stiff paste with beer. When dry, put over the fire and bake for an hour. Wait until quite cold before opening the lid. The product ought to be white. Separate all gray parts as they are not luminous. Make a sifter in the following manner: Take a pot, put a piece of very fine muslin very loose across it, tie around with a string, put the powder into the top, and rake about until only the coarse powder remains; open the pot and you will find a very small powder. Mix it into a thin paint with gum water, as two thin applications are better than one thick one. This will give a paint that will remain luminous far into the night, provided it is exposed to the light during the day.

ALANTHUS WOOD.—There have been many suggestions made concerning the use of alanthus wood for furniture purposes, and without having given sufficient thought of its adaptability, it has found many advocates, mostly on account of its attractive appearance when finished. A thorough test was concluded a few days ago, and it was found that the wood was hard to work, and failed to retain its shape. Aside from the desirability of possessing another good furniture wood, this failure is unfortunate in an artistic sense, for the delicate tint and irregularity of the grain would make rich effects.

AMERICANS LEARNING TRADES.—An inquiry set up in Philadelphia for the purpose of ascertaining what proportion of the young men who are learning trades are native Americans, shows rather an interesting result, namely, that in but two of the trades do American apprentices predominate—in the machine shops and printing offices. In nearly all the trades the German apprentices were found to be much in the preponderance. They are learning the trades their fathers learned before them. While they may be fully as successful in gaining a competence, the point is made by one of the Philadelphia papers, and justly enough too, that the American-born boy selects a trade that offers a scope for a higher order of intelligence, if indeed it does not present opportunities for a career. They cannot be accused of selecting trades of the dilettant order, for they are the reverse of that.

IRIDIUM PLATING.—Mr. W. L. Dudley recently announced, before the Ohio Mechanics' Institute, that the problem of electro-plating with iridium has been solved by employing a suitable solution of the metal and properly regulating the electric current. The solution is kept at uniform strength by using a plate of iridium as the anode. The metal is deposited in the reguline state, and takes a good polish. A huffing-wheel that will grind off nickel plating in a few minutes only serves to polish the iridium. Thin platinum foil, coated with iridium, retains its flexibility, and, if the coating is not too thick, it will not readily scale off. Copper plates for engravings, faced with iridium, would possess marked advantages over steel engravings.

SAW MILLS IN THE UNITED STATES.—It appears that there are no fewer than 15,024 saw mills in the United States, and 637 in Quebec, Ontario and Manitoba. The figures of the work performed by these mills are almost bewildering, and during last year nearly 750,000,000 feet more timber was manufactured than in the year 1881. Toward the close of the year new mills were being built in every direction so as to be ready for work this spring; all of which promises to keep insurance companies as busy as ever paying losses on this class of special risks.

FANGS OF THE RATTLESNAKE.—At a meeting of the Philadelphia Academy of Natural Sciences, Dr. Leidy exhibited a series of fangs taken from a rattlesnake fifty-two inches in length. The rapidity with which the functional fangs are reproduced was shown by the presence, on each side of the jaw, of five fangs in varying degrees of development, so placed as to replace those which are lost.

GOOD HEALTH.

Milk in Health and Disease.

Dr. A. P. Grinnell, of Burlington, Vt., recently gave a lecture before the Vermont Dairy-men's Society on "Milk in Health and Disease," a subject that is but just beginning to receive the attention it deserves by the American people. The doctor would have it distinctly understood that the mortality among children, which carries off one fifth of all who are born, before they have completed their first year, and one half before they reach the age of five years, is not as we have sometimes been taught at funerals, the work of Divine Providence, but the result of ignorance, and nothing else. Milk is the natural food of infants and they should have that and nothing else until the teeth are developed, which does not occur until the child is from seven months to a year old. It is not alone the absence of the teeth for chewing, that makes solid food unsuited to an infant stomach.

The food of adult persons is composed largely of starch, and the digestive organs of adult persons secrete fluids which help to digest starchy food, but previous to the seventh month the saliva and the pancreatic fluid have no power whatever to change the starch into sugar and thus render it digestible. Human milk is the best food for children, but since it is becoming unfashionable for human mothers to provide the natural food for their offspring, the milk of other animals may be substituted, and the cow's milk is the best we have, provided it is pure and wholesome. It should not be diluted by adding an equal bulk of water as is too often done. The milk of women and cows is so nearly alike in composition that if the latter be diluted one half by adding water, the child is in danger of starvation. Give the child plenty of pure milk until it is a year old, and nothing else, and it will not die from teething. It is just as natural to grow a tooth as to grow a tail.

The butter, or fat, is a valuable constituent in milk, but milk which has little fat is still wholesome and hearty, because the casein of milk is converted into fat by the digestive organs of the system. Milk as human food is sadly undervalued by the American people. A New York physician, who, at the age of forty years, found his health gone, adopted a diet of boiled milk and rice with nothing else whatever, and lived another forty years in almost perfect health, and was able to do the greatest amount of mental work of his life. Many persons suppose that milk is not adapted to all stomachs, but he did not believe that there is one in a thousand who could not use it with advantage. Milk is now being used largely as a means of restoring sick persons to health. In Pennsyl-

vania, a hospital for the bed ridden patients has become very popular. Patients who have lost the use of their muscles are put upon a diet of milk and nothing else. About two ounces is given at first, once in two hours. In one hour and a half it is digested. The amount is gradually increased till the patient will take a gallon per day. This treatment is accompanied with rubbing of the body, and in a comparatively short time the muscles are renewed, and become healthy and strong enough to allow the patient to get up and walk.

The Aim of Exercise.

It should be understood by the public, as it is known to the profession, that the aim of exercise is not solely to work the organism which is thrown into activity, though that is one, and a very important, part of the object in view, because as the living body works it feels, and as it feels it is replenished; but there is another purpose in exercise, and that is to call into action and stimulate the faculty of recuperation. Those who believe in the existence of a special system, or series, of trophic nerves, will not object to this designation of the recuperative function as a separate "faculty," and those who believe nutrition to be effected in and by the ordinary innervation will recognize the sense in which we employ the term in italics. It is through defect or deficiency in the vigor of this faculty that unaccustomed feats of strength, whether of mind or muscle, are found to be exhausting.

The task is performed, but the underlying faculty of restorative energy, or power of recuperative nutrition, located in the particular part exceptionally exercised, is not in a condition to respond to the unusual call made upon it. When a man goes into training, or, what is practically the same thing, when he habituates himself to the performance of a special class of work, he so develops this recuperative power or function, that the repair or replenishing necessary to restore the integrity and replace the strength of the tissue "used up" in the exercise is instantly performed.

The difference between being accustomed to exercise and able to work "without feeling it," and being barely able to accomplish a special task, and having it "taken out" of one by the exploit, whether mental or physical, is the difference between possessing the power of rapid repair by nutrition, and not having that power in working order—so that some time must elapse before recovery takes place, and during the interval there will be "fatigue" and more or less exhaustion.

The practical value of a recognition of this commonplace fact in physiology will be found in the guidance it affords as to the best and most direct way of developing the power or faculty of recuperation by exercise. Many persons make the mistake of doing too much. Exercise with a view to recuperation should never so much exceed the capacity of the recuperative faculty as to prostrate the nervous energy. The work done ought not to produce any great sense of fatigue. If "exhaustion" be experienced, the exercise has been excessive in amount.

The best plan to pursue is to begin with a very moderate amount of work, continued during a brief period, and to make the length of the interval between the cessation of exercise and the recovery of a feeling of "freshness" the guide as to the increase of exercise. We do not mean that false sense of revival which is sometimes derived from the recourse to stimulants, but genuine recovery after a brief period of rest and the use of plain nutritious food. If this simple rule were carried into practice by those who desire "to grow strong," there would be less disappointment, and a generally better result, than often attends the endeavor to profit by exercise unintelligently employed.—*Lancet*.

DIET IN BRONCHITIS AND ASTHMA.—A full meal with its resulting pressure upon the diaphragm is frequently followed by sudden deaths in patients suffering with bronchitis and asthma. Such persons should always leave the table hungry, and in selecting food should give the preference to concentrated nourishment, avoiding soups or other liquids and all substances the ingestion of which cause flatulence.

BRUISES.—Tincture of arnica is in general use as a lotion for bruises, but its value is greatly overestimated, and it is objectionable in that it sometimes acts as a powerful irritant. The following mixture used as a lotion is quite efficacious and no longer attends its use: Muriate of ammonia, two drachms; vinegar and water, of each two ounces; mix.

STINGS OF INSECTS.—The juice of the red onion is a perfect antidote for the sting of bees, wasps, hornets, etc. If applied freely soon after being stung, it gives almost instant relief. The sting of the honey-bee is always left in the wound and should be extracted before applying the onion juice.

FISSURED NIPPLE.—A simple and safe means for the relief of cracked nipple is to powder it repeatedly with pulverized gum-arabic. Immediately after the child has suckled, the powder should be dusted over the surface, and the nipple protected from the air.

REMOVAL OF STRONG ODORS FROM THE HANDS.—Ground mustard mixed with a little water is an excellent agent for cleansing the hands after handling odorous substances.



A. T. DEWEY. W. B. EWER.
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SAN FRANCISCO:

Saturday Morning, May 12, 1883

TABLE OF CONTENTS.

EDITORIALS.—Electric Light for Street Lighting; Improved Lifting Apparatus; Gold Mining in Venezuela, 821. Passing Events; Pool Mining for Gold; Hoisting Ropes and Drums; Patent Office Work; Local Manufactures, 328. The Bleiberg or Carinthian Process; New Cabinet Steam Baths; The First American Locomotive; Academy of Sciences, 329. Notes from Eureka, Nevada; Patents and Inventions; Notices of Recent Patents, 332.

ILLUSTRATIONS.—Electric Light Mast in Los Angeles; Sanborn's Lifting Apparatus, 321. Galland's Portable Steam and Air Bath; Longitudinal Vertical Section of the Bleiberg Furnace; Plan of the Bed of the Belding Furnace; Peter Cooper's Locomotive, 329. Peter Cooper, 326.

MECHANICAL PROGRESS.—Hardening Taps and Dies; American Heavy Steel Forgings; Paper Rails and Car Wheels; The Brickwork of Chimneys, etc.; Steel Castings; High Steam Pressure, 323.

SCIENTIFIC PROGRESS.—Notable Observations on Solar Radiation; The Phosphorescent Flame of Sulphur; Photographing Sound Waves; Freezing of Liquids in Living Vegetable Tissue; An Artificial Aurora; A New Method of Determining the Gravity of Solids; Influence of Animals in Preventing or Controlling Forest Growth; Galvanus Anticipated; The Electrical Resistance of Tempered Glass, 323.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends and Bullion Shipments, 324.

USEFUL INFORMATION.—Difference Between Dry Rot and Worm Eaten Wood; To Make Luminous Paint; Allantus Wood; Americans Learning Trades; Iridium Plating; Sawmills in the United States; Fangs of the Rattlesnake, 327.

GOOD HEALTH.—Milk in Health and Disease; The Aim of Exercise; Diet in Bronchitis and Asthma; Bruises; Stings of Insects; Fissured Nipple; Removal of Stone Odors from the Hands, 327.

MISCELLANEOUS.—The Soils of California; The Electric Light in Los Angeles, 322. Peter Cooper; Stored Energy, 326. A Curious Gold Mine, 327.

NEWS IN BRIEF.—On page 329 and other pages.

BUSINESS ANNOUNCEMENTS.

Mining Machinery—F. A. Huntington, S. F.
Metal Pipe Joints—Francis Smith & Co., S. F.
Dividend Notice—Standard Coal Mining Co., S. F.
Dividend Notice—Silver King Mining Co., S. F.
Situation Wanted by Mining Engineer—"E. K.", S. F.

Passing Events.

From the mining regions there is little to note, other than we have referred to in our mining summary. Everywhere miners seem to be busy on their claims, working away, prospecting them, or taking out ore. The gradual increase of the mining area of the coast, is bringing many new mines to the front. Moreover it is proving a good thing for old mines also, because new reduction works are going up everywhere, and it has become more common than formerly to work small lots of ore for miners, thus enabling them to get ready money with which to open their mine.

A noticeable feature just now is that the number of assessment mines is becoming much reduced; the levies are less frequent, and for smaller amounts, and new localities are coming into the field. A year ago, twenty-five mines were appealing in May, for \$500,400. This month only sixteen mines can be found in this category, and all they ask for is \$290,400. Of these sixteen mines, ten are in Nevada, and they are asking for \$249,400 of the total, thus leaving only \$41,000 for all the outlying States and Territories on the Pacific coast. There are only three mines in California in the list this month. These are the Campo Seco Copper, and McElroy Gravel, mines of Calaveras county, and the Golden Fleece Gravel mine, of Placer county.

Pool Mining for Gold.

In a recent number of the MINING AND SCIENTIFIC PRESS, we gave a brief description of a method of diving for gold in the streams and rivers of the United States of Colombia. Another interesting method of getting gold, practiced there, is "pool mining." The contrivance of the native for keeping himself at the bottom of a pool while engaged in collecting the detritus and sand from among the holders and out of the crevices in the formation, is very rude but effective. It is as follows: He selects an oblong quadrangular stone, weighing ten or twelve pounds. One side of this he makes concave, to be adapted to the nape of the neck, and then about it he works a netting. To this is attached a broad, flexible band of tough bark by both of its ends, and of such a length as to be slipped readily over the head, from behind, forward as far as the forehead, while the stone is resting on the nape of the neck. With the stone thus arranged upon his neck, and armed with the *almocafre* and *batea*, he is prepared for work.

The *almocafre* is a peculiar tool. The blade has a semi-elliptical shape, is about nine inches long and two inches broad at its base, with a gradual taper to the point, which is blunt. The shaft, which is in direct line with the long axis of the instrument, is cylindrical and receives a handle about eight inches in length. With this implement, which is made of tough well-tempered steel, the gold seeker scrapes and digs among the holders in the streams, and in the cracks and crevices of the strata everywhere.

Being prepared with this, the *batea* and the stone, the miner cautiously wades to that depth where he can retain his foothold, with his head above the water; then, throwing himself forward into the water, the weight of the stone bears his head downward into the pool. At the bottom he secures the *batea* stationary, by putting a stone into it; and then grouping about with the *almocafre* in hand, he scrapes together the auriferous sand and fills the *batea*.

Before the *batea* is loaded, the diver is compelled, perhaps several times, to rise to the surface for fresh air, and this he does by slipping the band from his forehead and casting off the stone. After rising to the surface he swims to the place where he can gain a foothold as before, and then drawing towards him the stone, by means of a cord attached to it, he replaces it upon his neck, and after he is sufficiently refreshed dives in the same manner again. The *batea* is necessarily always retained where the depth of the water is not greater than the diver's height, as it would be otherwise impossible for him to raise the *batea* full of sand. By this rude and tedious management does the gold washer obtain gold from the bottom of pools, which have not, generally, a greater depth than his own height. In this country this kind of gold mining has been done by dredges and vacuum pumps; but our system has the disadvantage of not getting any gold though more sand and water is raised. At least that has been the experience so far.

Local Manufactures.

Probably one of the most prosperous signs of the times in California is the apparent, gradual growth of local manufactures. In this city our manufacturing interests are slowly, but surely being enlarged in scope and variety, and most of them are in a prosperous condition. In Oakland the establishment of manufacturing industries is advancing in a marked degree. Along the water front and line of railroad, the building of several growing industries may be seen. Other towns are following the examples thus set, and manufacturing establishments, on a small scale it is true, are coming to the front. Our home products are varied and abundant, and since our attention has been turned to them more closely, we have, as a community, become more prosperous.

Now that the natural products are increasing we must continue to increase our manufactures. Our raw material should more of it be worked up at home; and, as this plan is more fully carried out, the cities and towns of California will be richer and the inhabitants more prosperous. We see the gradual growth of these manufacturing establishments with pleasure, because they promise a brilliant future for California. With these we are more independent, and our youth find employment at home. Every establishment of the nature alluded to does its share in the good work, and should, therefore, be encouraged by all good citizens.

Hoisting Ropes and Drums.

The diameter of a winding drum is determined mainly by the nature of the rope to be used, a much larger diameter being required for wire ropes than hempen ropes. But it should also bear some proportion to the diameter of the rope of a given material, since it is obvious that the thicker the rope the less readily it will coil upon a cylinder of a given diameter. A suitable diameter of the drum may be obtained in the following manner: Assuming ten feet to be the minimum diameter for a wire rope one inch in circumference, add six inches to the diameter of the drum for every increase of a quarter of an inch in the circumference of the rope. Thus a rope two and one half inches in circumference will require a drum $10 + 4.5 = 14$ feet 6 inches in diameter, and a rope of three and one half inches will require a drum of $10 + 7.5 = 17$ feet, 6 inches. As the diameter of the pulley and of the drum is increased, the life of the rope is lengthened, and it is obvious that, determined by the conditions of the wear in the rope, the diameters of the pulley and of the drum should be equal.

Round rope is wound upon the drum in parallel coils, and in some instances it is made to rise and return upon itself on cylindrical drums for the purpose of diminishing the length of the latter; the arrangement is, however, unfavorable to the durability of the rope. When the drums are conical, the overlap, is, of course, impossible, and the same necessity for it does not exist. A flat rope is always wound upon itself, so that its coils are all in the same vertical plane. Hence, practically, the diameter of the drum is constantly increasing or decreasing, and the velocity of the load consequently accelerated or retarded. This variation tends, of itself, to render the work of the engine unequal during the raising of the load. But it will be observed that this tendency is counteracted by a variation in the value of the load during the same time, and that, consequently, this overlap of the rope results in an equalization of the work of the engine. When the load starts from the bottom of the shaft it has its maximum value, for at that moment the weight of the whole length of the rope is added to that of the cage with its contained load; and it has been shown that the resistance due to the inertia of the mast must also be overcome at the moment of starting. But when the load has thus its maximum value, the diameter of the drum is at its minimum value, since the rope is then wholly uncoiled, and hence the leverage in favor of the load will also have reached its lowest limit.

Moreover, as the other portion of the rope will, at the same moment, be wholly coiled upon the drum, the latter will, relatively to this portion, have attained its greatest diameter, and, consequently, the leverage in favor of the descending load, consisting of the empty cage, its highest value. These circumstances are evidently favorable to the equalization of the work of the engine, and it will be seen that these circumstances continue throughout the time of winding. For, as the one portion of the rope ascends and diminishes in weight, the leverage in favor of it increases in a like degree, and as the other portion descends and increases in weight, the leverage in favor of it is diminished in like manner. The same advantages are obtained with round ropes, though under less favorable conditions, by making the drum conical. When the drum has this form, there is a liability of the rope slipping if any hitch should occur to slacken it, and such a slipping would probably cause rupture of the rope. The length, or as it is sometimes described, the breadth of the drum is obviously least with the flat rope.

When both portions of a round rope are wound upon the same drum, the length of the latter will be that required by a single rope, since one portion is being unwound while the other is being coiled upon the drum, so that the sums of the lengths coiled at any given moment is equal to the length of one portion of the rope. In such a case, one portion of the rope is wound over the drum, and the other portion under the drum. As both portions are wound over the pulley, one is thus wound in contrary directions, a circumstance unfavorable to its durability. The evil is removed by the use of two drums revolving in contrary directions, an arrangement which allows both portions of the rope to be passed over the drum.

The details of fixing the rope to the drum are very simple. Usually a notch or a groove is provided on the drum to receive the end of the rope, which is held by wedging. To avoid bringing the strain of the load upon this fastened end of the rope, the length is always regulated to leave two or three coils upon the drum when the cage is at the bottom of the shaft.

Patent Office Work.

We see it stated that pursuant to a clause in the Legislative, Executive and Judicial Appropriation bill, there will be a reduction in the clerical force of the United States Patent Office, on or before the first of July. Assistant Secretary Joslyn says, that from the overcrowded condition of the business of the Bureau it would not justify this reduction, the force now being smaller than it should be under this clause. There will be twenty-one dismissals.

It may not be generally known, but the fact is the Patent Office is a department of the Government which is not only self-supporting but profitable. The inventors of the country pay for the service which is rendered to them, and pay for it well; and they help others out by giving more money than is used for their good. The surplus earnings of the Patent Office are absorbed by the Government and used for other things.

It seems absurd, under these circumstances, to cut down the force in the office on the plea of economy, to a point where the interests of inventors suffer. The force is small enough now, so that the business does not go on quite as promptly as it might, were plenty of help employed. To still further reduce the force will be injurious.

The Patent Office does not keep what it saves, but turns it over to the U. S. Treasury, and then has to depend on appropriations for its support. With small appropriations the service is crippled and inventors lose time. It would seem but just that when the department earns plenty of money, it ought at least have enough of what it earns to be carried on properly. It is unjust to a very large and valuable class of the community, that their business should be interfered with by such a system as now prevails. There are many hundred thousand dollars to the credit of the Patent Office, and its efficiency should surely not be crippled by withholding this, and giving a scant appropriation. Some day the system will be changed.

Nevada Bullion.

The *Enterprise* says that, according to the generally accepted figures, the product of the Comstock lode may be thus in chief part distributed:

Belcher, 1871-'76.....	\$ 33,053,000
Caledonia.....	212,761
Crown Point, Nos. 1 and 2, 1871-'76...	29,780,000
California, 1876-'81.....	46,850,000
Chollar, 1866-'77.....	13,860,450
Confidence.....	915,000
Consolidated Imperial.....	240,839
Consolidated Virginia, 1873-'80.....	64,970,000
Gould & Curry, 1860-'71.....	15,644,200
Gold Hill.....	26,310,000
Hale & Norcross.....	8,010,800
Justice.....	3,270,000
Kentuck, 1865-'76.....	4,500,000
Ophir.....	11,800,000
Overman.....	1,581,000
Savage, 1863-'73.....	15,800,000
Sierra Nevada.....	1,300,000
Silver Hill.....	138,000
Succor Mill.....	60,000
Trojan.....	71,200
Yellow Jacket.....	14,647,400

Total.....\$293,018,150

Nevada has contributed about \$476,000,000 to the world's stock of the precious metals, of which at least \$140,000,000 was in gold, the chief part extracted from the argentiferous ores. Of this vast sum a single lode supplied from \$293,000,000 to \$315,000,000. A mean between the various estimates would make the product about \$306,000,000.

THE OVERLAND MONTHLY.—The *Overland Monthly* for May is an excellent number. It is thoroughly readable from beginning to end, with a pleasing variety of style and theme. "Pacific Home Making," is a sketch delightfully true to our California conditions, and contains many useful suggestions. Gen. Kautz's "Notes of Travel in Mexico," is another local subject. There are others just as acceptable which we have not room to specify. The editorial departments of the magazine are well done. The *Overland Monthly* is now published by Samuel Carson, 120 Sutter street, S. F.

VILLARD telegraphs that through connection to the Pacific coast is insured by August,

The Bleiberg or Carinthian Process.

A method of lead smelting, known by the name of either Bleiberg or Carinthian process, is pursued in the neighborhood of Bleiberg, in the province of Carinthia, in Austria, where it is employed for the smelting of a comparatively pure, but practically nonargentiferous galena. The process involves three stages. 1. Roasting or calcination of the ore at a gradually increasing temperature, for the production of plumbic oxide and sulphate. 2. The liberation of metallic lead, due to an increase in the temperature of the furnace, accompanied by vigorous rabbling, whereby the unaltered plumbic sulphide reacts upon the oxidized products of lead in the manner already described. 3. Reduction by carbonaceous matters of the oxidized compounds of lead, present in the slag produced in the last stage.

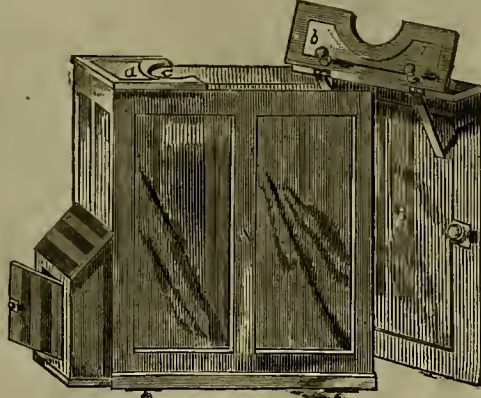
When pure ores, that is, such as do not contain much silica, although small quantities of lime, baric sulphate (heavy spar), and zinc blende may be present, are operated upon by this method, it affords a purer and softer lead than most other methods, with a good yield of metal, and with the production of only a small quantity of slag, which is, moreover, poor in lead; but for these results the process entails a large consumption of fuel, with a considerable expenditure of time and labor.

The Bleiberg reverberatory furnace, as shown in the engraving, consists of a chamber, *a*, measuring about 10 feet, 3 inches, from back to front, and about 4 feet in width at the back; while from the middle to the front or working door, *b*, it gradually narrows as shown. The fireplace, *d*, is a long, narrow chamber along one side of the furnace, the back of which, however, only receives the fuel, and communicates with the atmosphere from beneath: so that the flame passes over the fire bridge, *m*, along the surface of the bed or hearth of the furnace, and escapes by a flue situated immediately over the working door to a chimney, *c*, about 27 feet in height, and which serves for a pair of furnaces, usually built together. The bed of the furnace is formed by first ramming upon the brickwork a layer of clay, of about 6 inches in thickness and shaped to the form of the bed, while upon this rests the working bottom, formed of lead slabs of about the same thickness. The finished hearth is hollow or concave from side to side, and slopes gradually from back to front, or from the fire-bridge to the flue as shown, so that the melted materials from all parts of the furnace drain down to the lowest point at the front end of the bed, where the tap-hole is placed, and from which the metal flows from the furnace into a trough, *n*, placed outside. In front of the working door is a flue, *p*, which communicates with the main flue leading to the stack, and which serves to carry off to the latter any deleterious fumes escaping from the working door. The fuel employed in this furnace is generally spruce and pine woods; but by a little alteration in construction it permits of the substitution of brown coal in lieu of the wood.

The charge of from three to four cwt. of ore is introduced on to the hearth through the door, *b*, at the front of the furnace, and is spread uniformly over the surface of the hearth, where it is exposed to calcination at a low temperature, during from three to three and a half hours; and during this stage the mass is frequently rabbled, while at its conclusion the temperature is raised, and the charge again rabbled vigorously, when mutual decomposition of the plumbic oxide and sulphate with plumbic sulphide ensues, constituting the second stage of the operation, during which the separated lead runs from the tap-hole into the cast iron pot placed outside for its reception; and when lead ceases to flow, the residue or slag remaining upon the hearth of the furnace is either thickened by the addition of the ashes and small charcoal from the ash-pit, and then drawn from the furnace until another charge has been worked off, when the slag from the two charges is treated together, or, instead of this withdrawing the first charge, while a second is worked off, the slag may be at once treated with charcoal, constituting the third stage of the process, in which case the mixture of slag and small charcoal is thoroughly rabbled, and the temperature raised considerably with the maintenance of a reducing atmosphere in the furnace, whereby the plumbic oxide and sulphate of the slag suffer reduction by the carbonaceous matters, yielding thereby about 20 per cent. of metallic lead. The whole operation of working off two charges of ore in this manner, with the separation of metal from the slag produced by the first operation, occupies from 21 to 23 hours,

New Cabinet Steam Bath.

The engraving on this page illustrates a new device, by means of which, either a steam or hot air bath may be taken in one's bedroom. It is called a cabinet steam bath. It consists of a simple cabinet, arranged so as to be readily moved, and having a peculiar door, *B*, hinged so that a portion of the top opens with it. A section of the top on each side has a small circular cut, *c*, in it, and one half of this, *b*, is hinged to the main door, *B*, as shown; two small handles being provided by which the section, *b*, may be moved up or down, as required by the occupant, and without an attendant. At one end of the cabinet, *a*, is a small cupboard-like space in which is placed a pair of alcohol



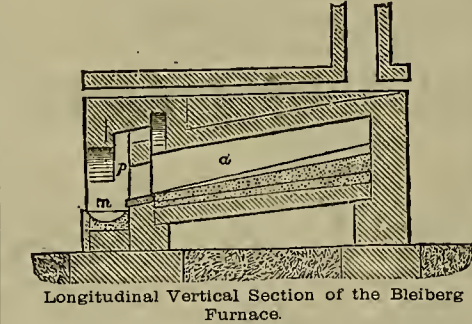
GALLAND'S PORTABLE STEAM AND AIR BATH.

lamps. Over these is placed a perforated iron grating, so that the flame of the lamps cannot rise too high, and is kept confined under the grating. This grating is arranged also to receive a shallow pan, into which water is placed so that steam may be produced. The bather enters the cabinet, closes the door, places his neck in the cut, *c*, and then closes down the other lid, *b*, so that nothing but his head is outside of the cabinet. The heated air soon fills the cabinet, or in case water has been placed in the pan, steam will fill the space so that either hot air or steam baths may be taken. The bath is prepared instantly, while one is undressing, and there is no danger of inhaling hot air or steam. The device is very portable in its nature, and can be moved readily about a room. It gives one

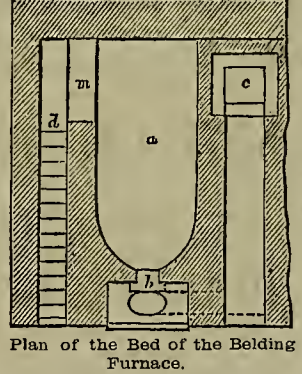
enhanced if the cars were run by a steam locomotive which could round the short curves of that road, Mr. Cooper built one which he called the "Tom Thumb." It had an upright boiler twenty inches in diameter by five feet high, fitted with gun barrels for flues. It had a single cylinder three and one fourth inches by fourteen and one fourth inches. The engine drove a large gear which meshed into another smaller gear on the axle. The fire was urged by a fan driven by a belt. The driving-wheels were two and a half feet in diameter. The wheels were "coued," and this was the first use of this principle as applied to car wheels, and was suggested by Mr. Knight, chief engineer of the road. On the 28th of August, 1830, the first railroad car in America, propelled by a locomotive, was tested on the Baltimore & Ohio road. The

"Tom Thumb" was coupled to a car in front of it, containing a load of four and a half tons, including twenty-four passengers. The trip of thirteen miles was made in one and a quarter hours, the best time for a single mile being three and one fourth minutes. The return trip was made in fifty-seven minutes. [On another page of this issue reference is made to the more prominent events in the life of the late Peter Cooper.—EDS. PRESS.]

PROGRESS OF THE BIG BEND TUNNEL.—The following progress was made in the tunnel of the Big Bend Tunnel and Mining Company, Butte county, Cal., for the month of April, 1883: Total number of holes drilled, 866; total depth of holes drilled, 5,412 feet; average depth of



Longitudinal Vertical Section of the Bleiberg Furnace.



Plan of the Bed of the Belding Furnace.

an opportunity to take a Turkish bath in his own room. Various styles of this cabinet bath are constructed, the price being graduated according to finish. The lamps may be adjusted from the outside by an attendant or from the inside by the bather. The bather sits, while taking the bath, upon a stool with a perforated leather seat, and so arranged as to be adjusted according to the height of the person using the bath. B. Galland, 303 Montgomery street, the inventor, has several styles on exhibition at his place of business. The bather does not sit immediately over the lamps, but to one side of them, though the heat is disseminated throughout the confined space in the cabinet.

The First American Locomotive.

We copy from the American Car Builder the accompanying cut of the first locomotive



Peter Cooper's Engine.

constructed in America. It was built in 1829 by Peter Cooper, who at that time owned lands on the Baltimore and Ohio Railroad, which had been constructed to be operated by horses. Believing that the value of the lands would be

holes drilled, 6.24 feet; number of pounds No. 1 powder used, 2,450; number of pounds No. 2 powder used, 1,000; number of drills sharpened, 710; time occupied in drilling 121 hours, 01 minutes; average time per shift, 1 hour, 20 minutes; number of carloads of rock extracted, 3,911; tunnel advanced per month, 345 feet; previously reported, 1,397 feet; total tunnel built to May 1, 1883, 1,742 feet. Owing to nine days' trial of a new rock platform in the tunnel, work was very much delayed. Had they been running as usual and no new things to experiment with, they should have made fully 400 feet progress instead of the 345 feet reported. The size of the tunnel is 10x16 feet, and the drills used are Ingersoll's.

CARRYING GOLD DUST.—In talking with the messenger this afternoon, a reporter was told of some of the peculiar plans that have been adopted for carrying dust from the mines into town. He said, to avoid suspicion, the dust is sometimes wrapped up in an old grain-bag and thrown into a water-bucket, hung beneath a mountaineer's wagon; or it is carelessly thrown into the bottom of the wagon in some straw where a robber would not think of looking. But this method is seldom adopted these days. The dust is consigned to the protection of the express agents who lock it up in their box and send it off under the guard of heavily-armed messengers.—Butte Record.

FOLLOWING is a statement of the April million product of the annexed mines:

Ontario, Utah.....	\$195,328
Homestake, Dakota.....	107,224
Highland, Dakota.....	44,526
Deadwood-Terra, Dakota.....	31,074
Father de Smet, Dakota.....	27,450
Total.....	\$405,693

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening, President Davidson in the chair. The following resident members were elected: William McM. Woodworth, Edward L. G. Steele, Walter M. Wolfe, Rev. E. L. Green, August Lillencrass, M. D., Judge Samuel J. Clarke, J. A. Richardson, and there was proposed for membership Chancellor Hartson. Among donations to the museum: L. Belding, of Stockton presented fifteen land and freshwater shells and ten rare sub-tropical varieties of birds from lower California, of which two are new. W. G. W. Harford presented a large green turtle finely mounted and six species of fish. Capt. F. T. Gilmore, seventeen specimens minerals from Oregon, including copper, iron ore (39 1/2 per cent.) manganese, hematite, chromite iron and coal. H. H. Bigelow, a large specimen of silicified wood. George Davidson, two rocks from Cerro Rohles, New Mexico. Jacob Z. Davis, a botanical album of Colorado wild flowers. Prof. John G. Leunmon, a valuable collection of seventy-one of the most interesting plants of Arizona, including seven large, showy new species. Seth Cook donated twenty-five volumes, including reports of the United States fish commission, etc. L. Belding also presented four photographs of Lower California natives, including the tribe of Yaqui Indians. Professor Davidson transmitted from the transit of Venus commission, thirteen photographs of the transit of Venus, December 5th and 6th, 1882, taken at Cerro Roblero station, New Mexico. The Superintendent of the United States Coast and Geodetic Survey sent a photographer to the National Observatory and had these prints made for this Academy.

A report was read from the committee appointed to prepare resolutions concerning the deposition of Robert E. C. Stearns, of Berkeley, Ph. D., who is about to leave California to be attached to the Conchological Department of the Smithsonian Institute at Washington. The report was as follows:

WHEREAS, It has come to the knowledge of this Academy that R. E. C. Stearns, Ph. D., who for many years has been associated with this body as Trustee, as well as one of its most active workers in science, is now about to leave our State, and as it seems to us that our brother should by no means quit us without some token of our appreciation of his great service, not only to us as a body, we therefore ask to have placed upon the records of this Academy our appreciation of the worth, ability and enthusiasm of our fellow member, and our deep regret that he not only leaves our body but is compelled to quit the Western Coast. Dr. Stearns has been identified with the earlier struggles of the Academy. He has brought to its councils an abiding faith in its success; he has enriched its proceedings with the thoroughness and honesty of his work, and he has exhibited the greatest breadth of view in his deductions and scientific investigations. We shall lose him, but not wholly, for his heart will be with us, and his pen and pencil will yet add their value to our work. We wish him God-speed in his new field of labor, where he is already so well known and appreciated. The Smithsonian can have no better man and no more able and conscientious a worker.

The above report was ordered spread on the minutes.

A. Wendell Jackson Jr., of the University of California, read a paper on the "Structure and Genesis of the Bassick Ore Deposit of Custer county, Colorado."

News in Brief.

Not less than 18 or 20 different persons in eastern Butte are beginning to raise carp.

A LAW has been made in New Jersey to prohibit the sale of tobacco to minors. A fine of \$20 is imposed upon the sellers who disregard it.

At Boston, Saturday, 7,000 people witnessed the close of the horse vs. bicycle race. The score stood: Horses, 911 miles; bicycles, 899 miles.

The Polar exploring ship Willem Barents, has sailed from Amsterdam for the arctic regions in search of the Dutch Arctic expedition in the Varna.

The widow of Prof. Henry Draper has given \$6,000 to the National Academy of Science, to be used in conferring medals for discoveries in sciences.

The largest vessels in the English Navy cost a million and a quarter dollars to build, and nearly a thousand dollars a day to keep them at sea afterward.

The Williams & Guion line steamship Alaska, has made the trip from Queenstown to New York in six days, twenty-three hours, forty-eight minutes.

AN Enterprising youngster of Los Angeles retails tarantulas by the canful, on the streets. The price is 25 cents per tarantula, and lots of custom at that.

OFFICIAL reports from the Governments of Fama, Simbeersk and Astrakhan, Russia, state that the crops are a total failure and famine is expected.

THE Nez Perce Indians, to the number of 125 adult males, held a council the other day, and decided that they were opposed to the building of a railroad through their reserve.

PROFESSORS Blake and Rolker have come from the East to Arizona to testify as experts in the coming trial of the Copper Queen Company vs. the Copper Prince Company.

Metallurgy and Ores.

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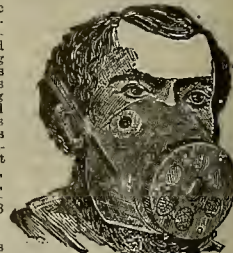
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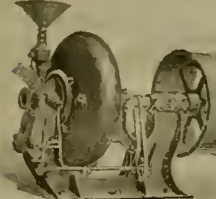
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—To RUN A—
BEDROCK TUNNEL
By Machine Drill. Call on or address
F. E. BIRGE, 104 Leidesdorf St., San Francisco.

San Francisco Cordage Factory.
Established 1866.
Constantly on hand a full assortment of Manila Rope, Bida Rope, Tarred Manila Rope, Hay Ropes, Whales Line, etc., etc.
Extra sizes and lengths made to order on short notice.
TUBBS & CO.,
611 and 618 Front Street, San Francisco

NOTICE OF REMOVAL.
The Clayton Steam Pump and Air Compressor Works would respectfully announce that they will remove May 1st, to their new works, 45 and 47 York St., Brooklyn, N. Y. (near the approach to the New York and Brooklyn Bridge).
CAREFUL MAILING.—We take all possible care to mail our papers prompt and correct, and we seldom hear of complaints in its postal delivery; yet we would thank any subscribers, who may happen to be in this city, to send us at once a postal card, giving full address and the date of the number missed, and we will remail them.

SELBY
SMELTING and LEAD CO.
416 Montgomery St., San Francisco
Gold and Silver Refinery
And Assay Office.
HIGHEST PRICES PAID FOR
Gold, Silver and Lead Ores and Sulphurets
Manufacturers of Bluestone.
ALSO, LEAD PIPE, SHEET LEAD, SHOT, ETC.
This Company has the best facilities on the Coast for working
GOLD, SILVER and LEAD
IN THEIR VARIOUS FORMS.
PRENTISS SELBY, - - Superintendent

Redlands.
Good water, rich soil and magnificent view.
High elevation, dry air, few fogs and northerns.

No brush or fences on the land, which is especially adapted to the culture of the orange and raisin grape.
Near to church, school, store and depot.
Hotel open. Telephone Communication.

Stage from San Bernardino Tuesdays, Thursdays and Saturdays.
The price of land has steadily advanced from the first price of \$50 per acre until now it is held at \$200 per acre.

SEND FOR CIRCULAR.
JUDSON & BROWN,
Redlands,
SAN BERNARDINO, CALIFORNIA.

PATENTS
BOUGHT AND SOLD FOR INVENTORS AND handled in UNITED STATES AND EUROPE. Profitable Investments in Valuable Patents made for Capitalists by
GEORGE B. DAVIS,
320 CALIFORNIA STREET, Room 14,
(Over Wells, Fargo & Co.'s Bank)
SAN FRANCISCO, CAL.
The Pacific Coast offers a good market for useful inventions. This office offers convenient and central quarters where inventors can exhibit and explain their models free of charge. Reliable Agents in Eastern States. Circulars sent free.

NONE
GENUINE
Without This
Trade Mark.
BEWARE
—OF—
COUNTERFEITS
—AND—
IMITATIONS
Albany Lubricating Compound and Caps.
The only perfectly reliable method of lubricating machinery, doing it almost without attention—absolutely without drip or seep—and at a merely nominal expense.

LARGEST STOCK OF
GENUINE EASTERN OILS
IN THE CITY.
HEADQUARTERS FOR ALBANY CYLINDER OIL
Tatum & Bowen,
25, 27, 29 & 31 Main Street, S. F.
187 FRONT ST., PORTLAND.

PACIFIC POWER CO.
Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

COPPS' U. S. MINERAL LANDS,
Laws, Forms, Instructions and Decisions.
Has no surplus verbiage. Contains Dr. Raymond's Orosary. Explains how to examine mining titles. Contains numerous court decisions. Gives the Public Land Commission its Codification, and gives many an improved forms. Price—Full law binding, extra paper, \$0.00.
For Sale by DEWEY & CO., San Francisco.

IRON SLUICE RIFFLE.
I have an Iron Riffle, adapted for Hydraulic, Drift and Quartz sluices, which is proving very efficient, below everything else. (Cost six cents per pound.) Address, **ALBANY B. PAUL,**
Room 20, Safe Deposit Building, San Francisco
The following speaks for itself:
INDIAN SPRING DRIFT MINE, Feb. 26, 1883.
Mr. A. B. Paul:—I have tried your Riffles thoroughly, and find them a fine Riffle. They are good with quicksilver or without. They gather the fine gold and rusty gold. I find gold that will not touch quicksilver stops in them, and which glides over 300 feet of sluice above them. I shall try 30 more, and if they save the same amount of gold in four weeks' run, I shall want 100 more. I am not afraid to vouch for them.
B. G. McLAIN,
Superintendent Indian Spring Drift Mine.

WHITALL, TATUM & CO.,
NEW YORK. PHILADELPHIA.
—MANUFACTURERS OF—
CHEMICAL AND OTHER GLASSWARE.
CATALOGUES SENT UPON APPLICATION.

Inventors' MODEL MAKER.
L. PETERSON
255 Market St., N. E. cor. Front, up-stairs, San Francisco
Experimental machinery and all kinds of models, tin, copper and brass work
FINE WOOD PHOTO ENGRAVING
SEND COPY FOR ESTIMATE
—CROSSCUP & WEST.
17-19 PAY YOU 1702 CHESTNUT PHILADELPHIA

N. W. SPAULDING'S



PATENT DETACHABLE TOOTH SAWS,
Manufactory, 17 & 19 Fremont St., S. F.

H. H. BROMLEY,
Dealer in Leonard & Ellis Celebrated
TRADE MARK
VALVOLINE
STEAM CYLINDER AND MACHINE OILS,
The Best and Cheapest.
These Superior Oils cannot be purchased through dealer and are sold direct to consumer only by H. H. BROMLEY sole factor in these goods.
Reference—Any first-class Engine or Machine Builder in America. Address, 43 Sacramento St., S. F.

THE BEST IN USE!
DUK'S
IMPROVED ELEVATOR
BUCKET

This is the only Scientifically Constructed Bucket in the market. It is stuck out from charcoal stamper iron. No corners to catch. No seams to burst. No interior corners to clog up. It runs with great ease, and half the power of the old style bucket. WILL OUT-WEAR HALF A DOZEN OF THEM.
PRICES REDUCED.
T. F. ROWLAND, Sole Mfr.
Brooklyn, N. Y.
H. P. GREGORY & CO., Agents, San Francisco, Cal., carry a stock of all sizes.

LORD'S
Boiler Cleansing Compound,
For the prevention and removal of Scale in Steam Boilers, and for Neutralizing Acid, Sulphur and Mineral Waters.
Important safeguard and remedy for all users of steam. For Circulars and all information regarding its use, please apply at office of the Agents.
JOHN TAYLOR & CO.
118 & 120 Market and 15 & 17 California St., San Francisco

FIGARI & RICHMOND'S
BOILER AND TUBE COMPOUND.
We guarantee our COMPOUND to remove all scale and prevent any more being deposited. The COMPOUND forming a glazed surface on the iron, to which no scale will adhere and which preserves the iron. The preparation is strictly vegetable, and is warranted to do all that is claimed for it without injury to the metal. Send for a circular.
H. P. GREGORY & CO., Agents,
San Francisco.
This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 509 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St. S. F.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING MAY 1, 1883.

276,677.—POST DRIVER—H. E. Fairman, S. F.
276,690.—MEASURING DEVICE FOR SHOT POUCHES, ETC.—A. T. Hazard, Los Angeles, Cal.
276,593.—COMBINED STOCK AND CASE FOR FIRE ARMS—John Jett, S. F.
276,823.—MACHINE FOR SOLDERING TIN CANS—J. J. Johnson, S. F.
276,701.—POSTAL SCALE—J. F. Miller, Oakland, Cal.
276,710.—DRY ORE SEPARATOR—P. W. Reardon, San Jose, Cal.
276,711.—COMPOSITION FOR LUBRICATING AXLES—H. W. Reddan, S. F.
276,886.—WINDOW SASH—A. Rudolph, S. F.
276,887.—WINDOW SASH—A. Rudolph, S. F.
276,740.—WATCHMAN'S TIME DETECTOR—H. J. Wenzell, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

WINDOW SASH.—Alexander Rudolph, S. F. No. 276,887. Dated May 1, 1883. The invention relates to certain improvements in window sashes of that class in which the frame holding the glass is pivoted on supplemental side bars, which slide up and down in the window casing; and it consists of a window sash and supplemental side bars, having corresponding longitudinal grooves and tongues to make a tight joint between them when closed together, in combination with central pivots and supporting center pieces having double inclined sides. These pieces slide obliquely through slots in metallic plates which are fixed to the side bars, so that the bars and sash may be separated when the sash is to be turned, and kept apart and brought into contact again by gravitation alone. When the lever is turned to release the parts they are closed together again by the weight of the sash. In connection with these devices are certain novel features of construction.

WINDOW SASH.—Alexander Rudolph, S. F. No. 276,886. Dated May 1, 1883. This improvement in window sashes consists of a sash pivoted at each side to a guide piece, these guides fitting into grooves in the frame, so as to run up and down, and the pivots allowing the sash to be turned, and in combination with these a series of hooks or clasps, by which the sash and guide-pieces are drawn closely together to exclude air, and are supported by the heel of the elasp when unlocked. It also consists of a peculiar heveled projecting plate upon one side, and a corresponding socket upon the other, where the pivot pins unite the sashes to the guide pieces, which serve to force the sashes away from the guide-pieces when they are turned, and thus concentrate all friction to a point about the pivot pins.

POSTAL SCALES.—J. Frank Miller, Oakland. No. 276,601. Dated May 1, 1883. This invention relates to an index or self-registering balance scale, which is specially intended for postal or other similar purposes; and it consists of a series of graduated weights suitably supported so as to be lifted consecutively and in a manner to counteract oscillation by means of a lever arm, which has the weight supporting pan upon its outer end, so that when it is raised it will lift the weights successively from their support as it moves. A curved, graduated scale is fixed so that an index pointer upon the end of the lever will indicate the weight, or its equivalent postage, the moment the letter or other object is placed upon the pan; or the pointer may be fixed and the graduated arc made movable.

POST DRIVER.—Harry E. Fairman, S. F. No. 276,677. Dated May 1, 1883. The invention consists in planting the ends of the weight guides or leads firmly on the ground, by rocking the axle with which the machine is connected, in a means for adjusting the perpendicularity of the weight guide, and in a novel device for holding the post steady, and in a novel raising and tripping mechanism for operating the weight. The object of the invention is to furnish a machine for driving posts for fences, etc., which may be readily taken from place to place and be firmly stationed to complete the work of driving the post.

CASPAR COURIER.—This is the name of a new weekly at Caspar, Mendocino county, by Chas. B. Huse. Mr. Huse is a young man of spirit and industry, and will, we expect, do much to make better known the resources of his part of a rich country. He has our best wishes.

ENRICH and revitalize the blood by using Brown's Iron Bitters.

Notes from Eureka, Nevada.

[From Our Regular Correspondent.]

There is little or no change to note as, having taken place, since my last letter to the MINING AND SCIENTIFIC PRESS, on Ruby Hill. The Locan shaft has been sunk about thirty feet, and is now down 1,110 feet from the surface. At the furnaces there are signs of increasing production in the small mines. The Eureka Con. floors are full, the Richmond hins contain more ore than I have seen in them for many months past, and the floors are crowded. At present the continued stormy weather has left the roads in a heavy condition, but when they become dry and firm, it is expected that the shipments of custom ores will increase rapidly. The ore body in the Home Ticket mine is increasing in size, and about sixty tons per week are being sent to the furnaces. This mine is one of the Ruby-Dunderberg series. The company is sinking a new shaft, and building new ore platforms about forty feet from the side line of the Golden Rule series, and the last named property is consequently becoming more valuable. The Golden Rule Con. Co. are driving their tunnel ahead, and will soon tap the ore body, presumably the same that is being developed in the Home Ticket mine, as that is striking toward the Clipper location of the Golden Rule series. On Wednesday last, a vein of quartz six inches thick was cut in the Golden Rule crosscut, which is being steadily pushed ahead with increase of good prospects.

The Eureka Tunnel.

Which is within a thousand feet of it, is looking well, as usual, and better if anything. The Engine shaft is down to the 105 level, and connection has been made with the No. 3 drift. There is a small but rich streak of galena near the point of connection in the drift, and above it is a seam of good carbonate, ledge matter a foot thick between the hoth. The No. 2 winze has been connected with the bottom of the Addison chambers—south end. Here the ore body is about twelve feet high, sixteen feet wide, and twenty feet long. Four feet in thickness of this is very high grade ore, and the balance is of good quality. A raise is being made in the Addison chamber, north, in a northeasterly direction, on ore now up 20 feet. At

The Alexandria Mine

The Dilligent shaft is down 200 feet and cribbed 100 feet. Here a station will be cut out. The next station below this point will be at the 200 foot level, and another will be cut out at the 315 foot point in the shaft, from which a drift will be driven northerly to connect with the old Alexandria incline. In the Sterling tunnel, which is a part of the Alexandria workings, about five tons of high grade ore is lying awaiting shipment to the smelters.

At the Frankie Scott Con. the lessees are driving a tunnel from the Charlotte location to connect with the old works, for the purpose of facilitating the removal of waste rock, and extracting ore. They will commence shipping ore in a week or ten days.

Ore Shipments

Will be resumed from the Great Republic in a few days. The ore from this mine is of good quality, and there is a great quantity of it upon the dump.

The Ruby Hill tunnel on the west side of Prospect mountain, is in 210 feet from the crosscut with a seam of ledge iron in the face. The Richmond Con. Co. is prospecting steadily in the Hoosac mine, on Hoosac mountain, and the lessees of the Rocky Point mine, which is situated on the north end of the same mountain, have just shipped seven tons of heavy galena ore to the Eureka Con. furnaces. Ore is being extracted from the Williamsburg mine, north of Adam's hill, from a vein about one foot thick. It is of fair grade, and carries a high percentage of lead. At the Altoona mine, on Adam's hill, the main shaft is down eighty-five feet, and a crosscut is being driven through ledge matter, and low grade ore, which it has penetrated ten feet. The appearance is very promising, and sufficient to justify the hope of discovering a larger body of ore than any yet found in Adam's hill. On the May ledge, a new shaft has been started in the cap rock, and some ore of excellent quality is being found in the crevices; an assay from thick, gave \$55 in gold, \$67 silver, and 20% lead. A few feet easterly from the Altoona shaft is a hole ten feet deep, out of which was taken fifty tons of ore which worked at the furnaces \$108 per ton, and five tons that yielded \$290 per ton. Considerable work is being done in the Horace Tony mine, with good results. These mines are all on the quartz belt of Adam's hill, where there is an immense field for exploration.

In this neighborhood there has been
A Great Deal of Useless Work done, but as the formation is better understood than formerly, future explorations will be more profitable to the owners than in times past. Ore shipments to the Richmond furnaces are coming in steadily from the Dunderberg, Home Ticket, Connolly, Idaho, and Bay State mines. The last named, is of Newark District.

Twenty-four tons of heavy lead ore was shipped from the Original mine, on Silverado mountain, to the Richmond furnaces last week.

On the 25th ult. the miners of the

Pinto District

Held a meeting, the first for several years past. A general interest is re-awakening in this prom-

ising camp, and new claims are being recorded almost daily. M. B. Bartlett, a wide-awake business man of Eureka, has lately purchased a half interest in the Champion mine, which lies on the outskirts of the Pinto district, and will commence work on the ground within ten days from the present.

Mr. Bartlett, who has been merchandizing and dealing in real estate in Eureka for several years past, is also a man of many years' practical experience in mining. He was also one of the owners in the Geddez & Bertrand mine, Secret canyon, before it passed into the hands of Messrs. Gilmer and Salisbury. A new strike of very rich ore in this mine was reported a few days ago, which I do not doubt is true, and which, if true, will run the average of the ore up to a much higher grade than any that has been yet run through the mill. It is not generally known that, while Richard Berryman had the lease of the Geddez & Bertrand mine, he gouged out all of the best ore he could find in the 150 chamber, and left the low grade standing. This is true. It was also necessary, as until the Bertrand company built their mill and commenced reducing the low-grade ore by the leaching process, it was unprofitable to mine. Some good ore is being extracted from the Endeavor mine, Secret canyon, and the owners of the Water Jacket being thereby encouraged, will shortly commence work upon that mine. There will be a great deal of life in Secret Canyon district during the coming summer, and, as it adjoins Eureka district, we shall enjoy some of the benefits.

M. H. JOSEPH.

Not an alcoholic beverage, but a true and reliable family medicine, is Brown's Iron Bitters

VOLCANO, AMADOR COUNTY.—"A. M. H." writes us as follows: The rain gives the miners a chance to make something this spring, for they were idle all winter. We have some good gravel mines which pay well when we can get water; also some rich quartz mines in several localities, all over the county, which pay well. In Volcano, the Downs' mine is very rich, and the mill is crushing the best ore of the most of the time; also several other small leads that pay very well. The Tunnel company are making quite a large hole in the flat.

TRUE Temperance

Is not signing a pledge or taking a solemn oath that cannot be kept, because of the non-removal of the cause—liquor. The way to make a man temperate is to kill the desire for those dreadful artificial stimulants that carry so many bright intellects to premature graves, and desolation, strife and unhappiness into so many families.

It is a fact! BROWN'S IRON BITTERS, a true non-alcoholic tonic, made in Baltimore, Md., by the Brown Chemical Company, who are old druggists and in every particular reliable, will, by removing the craving appetite of the drunkard, and by curing the nervousness, weakness, and general ill health resulting from intemperance, do more to promote temperance, in the strictest sense than any other means now known.

It is a well authenticated fact that many medicines, especially 'bitters,' are nothing but cheap whiskey vilely concocted for use in local option countries. Such is not the case with BROWN'S IRON BITTERS. It is a medicine, a cure for weakness and decay in the nervous, muscular, and digestive organs of the body, producing good, rich blood, health and strength. Try one bottle. Price \$1.00.

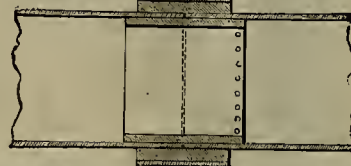
New Firm.

A new firm in the paint, oil and glass trade has lately been established in this city, composed of W. D. O. Sullivan (son of C. D. O. Sullivan, vice-president of the Hibernia bank) and David Ravekes, for many years connected with the firm of Whittier, Fuller & Co. They have succeeded in obtaining several agencies for well known eastern firms, among which may be named Sherwin, Williams & Co., superfine oil and coach colors; Murphy & Co., varnishes and Germania white lead. The place of business of the new firm is at Nos. 220 and 222 California street.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

JOINT FOR SHEET METAL PIPE.

RE-ISSUE PATENT NO. 8,214 TO JOSEPH MOORE AND FRANCIS SMITH.



"The invention consists in connecting the meeting ends of the pipes firmly together and placing a band or tube around the outside of the meeting ends, which is larger in diameter than the pipes and which is long enough to extend a distance on each side of the joint and then filling the space between the outside band or tube and the pipe, with a packing of lead or other soft material, either by casting or tamping."—[Extract from specification of Patent.]

These joints have been tested for 8 years, and are undoubtedly the best joint made for sheet iron pipes—THE BEST AND CHEAPEST.

Any INFRINGEMENT will be PROSECUTED.

FRANCIS SMITH & CO.,
Manufacturers of Pipe of all Kinds,
130 BEALE ST., SAN FRANCISCO.

MECHANICAL ENGINEERING.

A first-class DESIGNER and MECHANICAL ENGINEER, capable of designing Steam Engines—stationary and marine—now holding a position of head draftsman in one of the leading Eastern engineering works, would be willing to take a similar position on the Pacific Coast under favorable circumstances. Address E. K., this office.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, May 2, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 54, of Twenty-five Cents (25c) per share, was declared, payable on SATURDAY, May 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WM. WILLIS, Secretary.

OFFICE—Room No. 29 Nevada Block, No. 300 Montgomery street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company.

San Francisco, May 1, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 41) of Twenty-five Cents (25c) per share was declared, payable on TUESDAY, May 15, 1883, at the office of the Company, Room 19, No. 323 Montgomery Street, San Francisco, Cal. Transfer books will close May 9, 1883.

JOSEPH NASH, Secretary.

ASSESSMENT NOTICE.

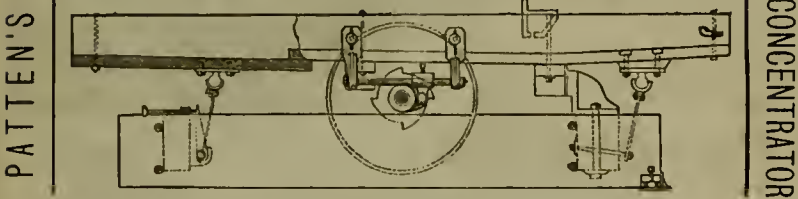
Seaton Gold Mining Company.—Location of principal place of business, San Francisco, California; location of works, Drytown, Amador county, Cal. Notice is hereby given that at a meeting of the Board of Directors, held on the 10th day of April, 1883, an assessment (No. 2) of a vein and one-half cent (7½) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Treasurer, A. Warner, at his office, No. 224 Kearny street, room 2, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 14th day of May, 1883, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 5th day of June, 1883, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

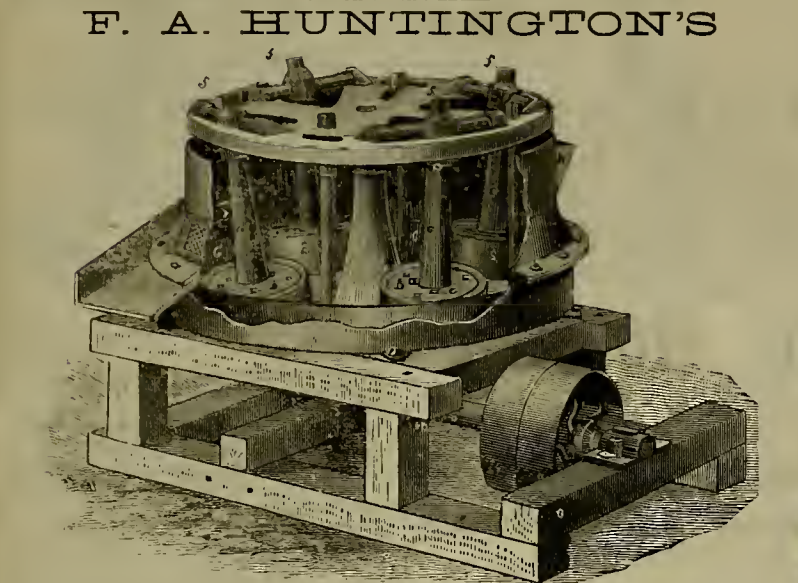
A. MARTIN, Secretary.
OFFICE—Room 6, 523 California street, San Francisco, California.

MILL & MINING MACHINERY.

F. A. HUNTINGTON,
No. 45 Fremont Street, San Francisco, Cal.



This machine requires less power, less care or attention, and is less liable to get out of repair than any concentrator now in use. All of which any practical miner will comprehend when seeing it in operation. The wear and tear is nominal, and the construction so simple that any miner can put it up and run it, and the low price brings it within the reach of all mill men, as it will save enough to pay for itself in any mill in a very short time. One machine will concentrate the tailings from a five-stamp battery.



CENTRIFUGAL ROLLER QUARTZ MILL!

After running one of these mills on the Whidden mine, in El Dorado county, over four months, and thoroughly testing its capacity and durability, I am prepared to offer it to the mining public, and claim for it the following advantages over the drop stamp mill:

1. The cost of same capacity is not more than one-half that of stamps.
2. Freight to mine one-fourth that of stamps.
3. Cost of erection at mine one-tenth that of stamps.
4. It runs with one-third the power per ton of ore crushed.
5. The wear is less than that of stamps.
6. The wearing parts are easily duplicated.
7. It has a much better discharge, and leaves the pulp in better condition for concentrating.
8. It is a better Amalgamator, saving fully nine-tenths of the gold in the mill; the balance can be saved on plates in the usual manner.
9. It is continually crushing; not like the stamp, using power to suspend it in air ninety-nine one-hundredths of the time, and the balance making a thundering noise, and accomplishing comparatively small results. It is as far in advance of the stamp mill as the present method of making flour with improved rolls is over the Indian's mode of crushing corn in a stone mortar.

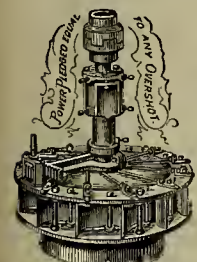
F. A. HUNTINGTON, ESQ.—DEAR SIR: Your Centrifugal Roller Quartz Mill has run on the Whidden Gold Mining Company's property, at Shingle Springs, El Dorado county, Cal., about four months, and it did good and satisfactory work; a greater portion of gold remaining in the mill than in a stamp battery.

Mills Erected with all Appliances Complete. Capacity and Durability Guaranteed.



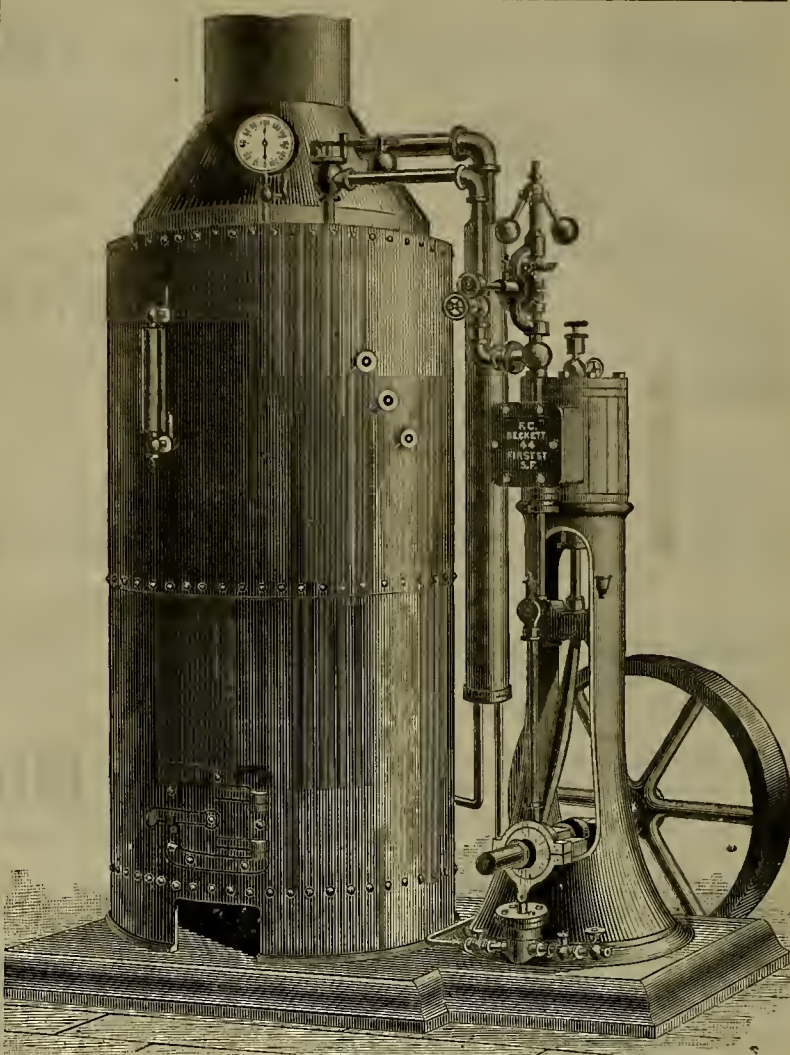
THE CONSUMERS' COMPANY.
VULCAN B B,
Black Glazed Powder,
In kegs and cases. The Best Low Grade Explosive in the market. Contains no Nitro Glycerine. Superior to Judson or any Black Powder made.
Is Unequaled for Bank Blasting & Railroad Work.
VULCAN NOS. 1, 2 AND 3,
The Strongest, Most Uniform and best Nitro Glycerine Powder manufactured, as which we are prepared to furnish at very lowest price.
Caps and Fuse of all Grades at Bottom Rates.
VULCAN POWDER CO.,
218 California St., San Francisco.

JAS. LEFFEL'S TURBINE WATER WHEEL,
The "Old Reliable,"



With Important Improvements, making it the
MOST PERFECT TURBINE NOW IN USE,
Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power.
Those improving water power should not fail to write us for New Prices, before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address
JAMES LEFFEL & CO.,
Springfield, Ohio, and 110 Liberty Street, New York City

PARKE & LACY, General Agents, 21 & 23 Fremont St., S. F.



F. G. BECKETT,
Manufacturer of
VERTICAL AND HORIZONTAL ENGINES AND BOILERS,
FROM 2 TO 90-HORSE POWER.
Improved Hoisting Engines, Engines for steam Yachts. Engines for pumping artesian wells and irrigating and farming purposes, and all kinds of Machinery.
Repairing Promptly Attended to.
No. 44 FIRST STREET. SAN FRANCISCO, CAL.

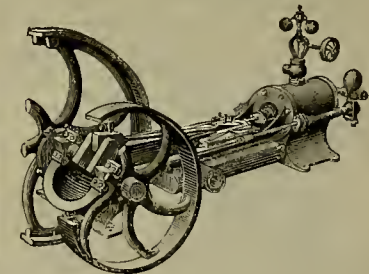
The Excelsior Phaeton
Manufactured by J. A. BILZ,
Carriage Manufacturer,
Machinist and
Blacksmith Shop,
Pleasanton, Cal.



The above Phaeton is guaranteed free from all joggling motion, and is as easy riding as any Buggy. By the peculiar way in which the shafts and body are hung, all "jar" is removed both from the horse and rider. The Excelsior Phaeton is made in four different styles, ranging in price from \$80 to \$160.
Patent Right for counties and States abroad for sale by the inventor and manufacturer.
FRANK BROS., Agents,
310 and 321 Market St., San Francisco, and San Jose.

SQUARE FLAX PACKING.

Entirely Exempt from Hemp or Jute,
—AND—
THE BEST IN THE WORLD
For either Steam or Water.
ENGINEERS WILL FIND IT JUST WHAT THEY HAVE BEEN WANTING.
Send for sample and price list. Manufactured by
W. T. Y. SCHENCK,
30 California Street, San Francisco, Cal.
Dewey & Co. 252 Market Street, Patent Agents



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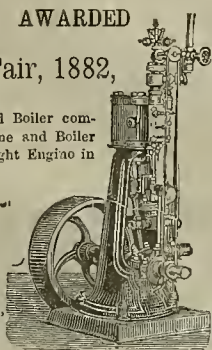
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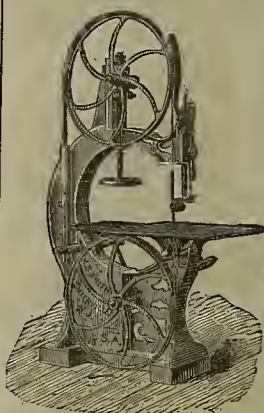
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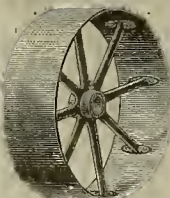
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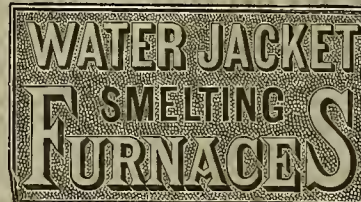
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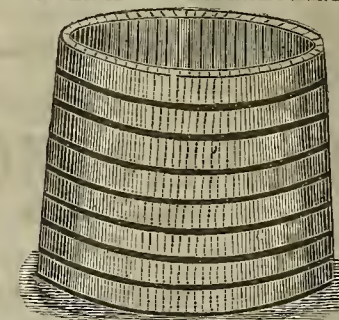
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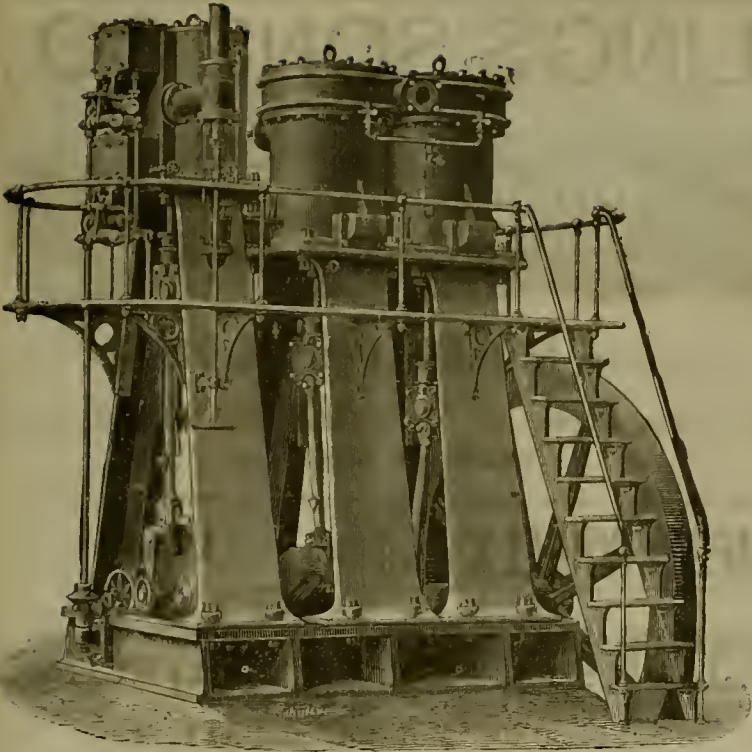
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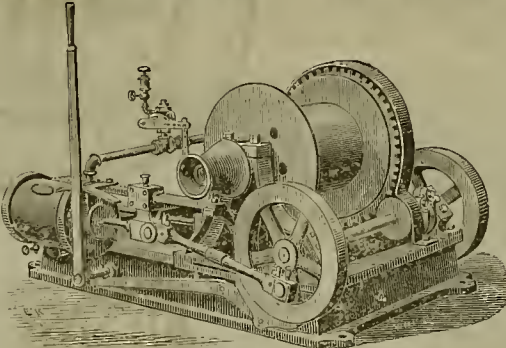
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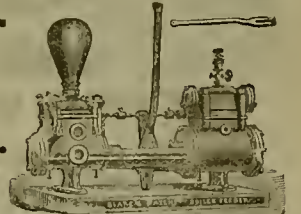
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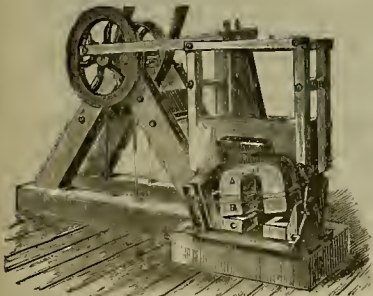
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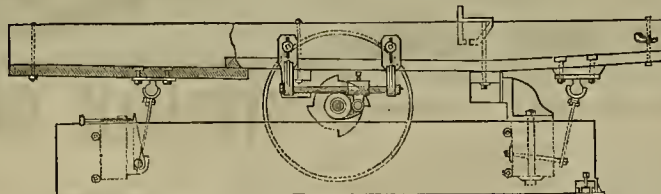


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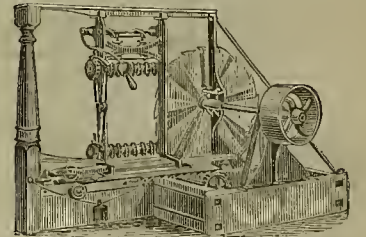
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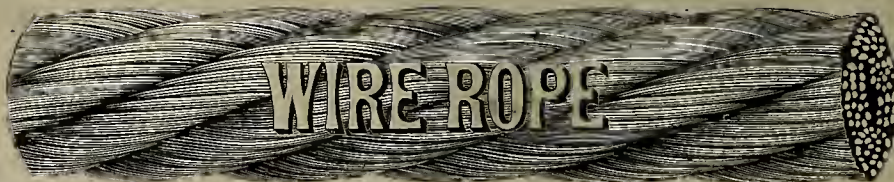
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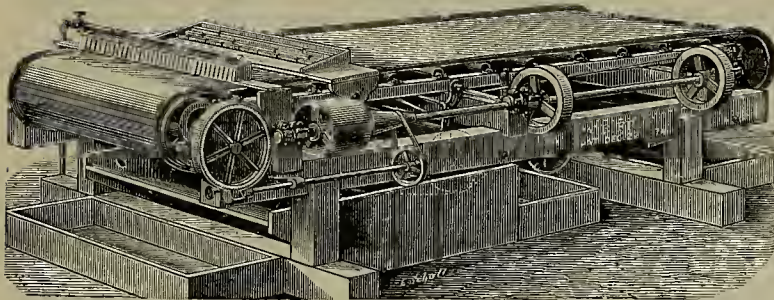
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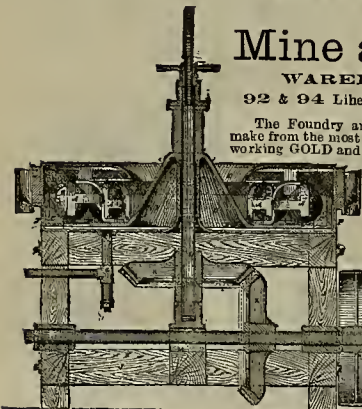
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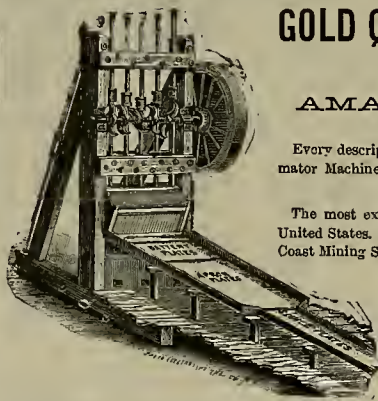
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SAN FRANCISCO, SATURDAY, MAY 19, 1883.

VOLUME XLVI
Number 20.

Headwaters of the Arkansas.

On this page we give an engraving which shows Fremont Pass, at the headwaters of the Arkansas.

The Arkansas river rises in the Tennessee pass, nearly west of Mount Lincoln, in latitude 39° 21', and longitude 106° 19', and flows a little east of south for a distance of about eighty miles in a straight line, when it flexes to the east, and flows through a deep canyon in the granite, and emerges into the plains near Canyon City. Near the junction of the east branch of the Arkansas, the valley, with the terraces on either side, continues pretty regularly about five to eight miles in width, but gradually closes up again below Lake creek, though on

of this force has not been adequately understood, but the wider our range of observation, the greater is our conception of its power. We may safely assert that at some period comparatively modern, 10,000 or 15,000 feet of sedimentary beds extended uninterruptedly from the South Park across the interval now occupied by the Sawatch range, all of which but insignificant remnants, have been swept away, while a mass of the granite nucleus, of inconceivable dimensions, has also been removed. The general elevation of the Sawatch range for sixty to eighty miles is 13,000 to 14,000 feet above the sea at this time, and it is highly probable that hundreds, and perhaps thousands of feet have been removed from the summit.

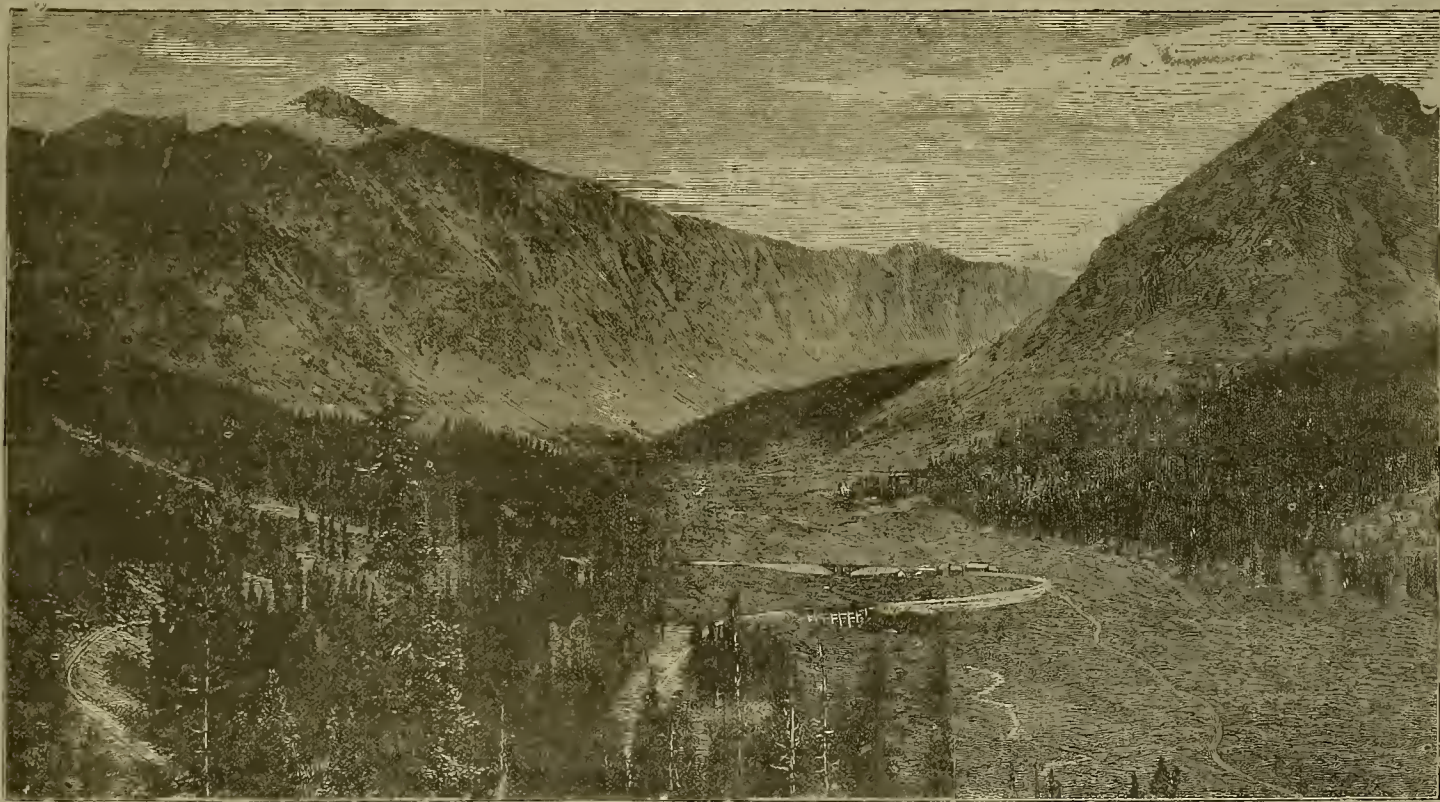
In 1845, Fremont, at that time a Lieutenant in

New Dry Ore Separator.

In a new form of dry ore washer just patented through the MINING AND SCIENTIFIC PRESS Patent Agency by Patrick W. Reardon, of San Jose, the riffle box is suspended on spring-hangers from posts, so as to allow a vibration to be imparted to it. The riffle box is a three-sided, open ended frame, the bottom formed with riffles, and in such a manner as to present a short, steep face and a longer, gentle incline opposite. They resemble right-angle triangles lying upon the hypotenuse. Across the edge or face of each riffle, near its top, is a cleat for the heavier material to lodge against. A flat, adjustable cover fits down over the riffles, arranged so greater or less space can be

The riffle box has a downward inclination to the rear, as have the connecting pipe and wind box. This facilitates the operation of the device, which is as follows:

Ore is placed in the hopper, and its discharge regulated according to circumstances. The wind (a constant blast) is forced into the wind box, and, by reason of said box, spreads itself laterally, while contracting vertically, so that its force is equalized upon the body of ore in front of it, and its full effect delivered to drive it through the slot or aperture down through the connecting pipe into the riffle box. This box having a vibratory movement, tends to settle the ore so that the steady current of air passing along the upper portion of the box will carry off the light particles. If any of the



FREMONT PASS HEADWATERS OF THE ARKANSAS.

either side are vast deposits of the coarse drift material extending high up on the mountain sides, especially on the west side of the valley. The valley then gradually expands out and enlarges, about five to ten miles in width, for a distance of nearly forty miles.

On either side of the valley small streams flow into the main channel of the Arkansas, from the source to Canyon City. These streams usually have their origin at the very crest, or water-divide of the two ranges, and, in most instances, have cut their way through the solid mass to the main river. Many of these streams have numerous side branches, which have also carved out wonderful gorges near the crest of the mountains, giving to these mountain ranges a ruggedness that is almost inconceivable to one who has not actually explored them. It is in the study of these gorges that the geologist learns to appreciate the immense results of erosion in giving form to the rocky range of the West. Even yet the power

the Corps of Topographical Engineers, skirted the northern border for a short distance. He came up the Arkansas river, crossed the main divide at Tennessee pass, and traveled down Eagle river as far as the mouth of creek. Here he crossed the river and took the trail over to White river, which stream he followed down some distance, then crossed the country to the Green river, thence to Salt Lake City.

The pass was named after General Fremont. The Arkansas river is, next to the Missouri, the largest affluent of the Mississippi. It rises at the west-central part of Colorado, and its length is 2,170 miles. It is navigable for steamers 800 miles from its mouth, during nine months of the year.

Gold Mines in Oseola District are now presenting a better appearance than they have since their discovery.

CONSIDERABLE ore is being shipped to this city from Calico, San Bernardino county.

left between its under side and the riffles. A longitudinal vibration is imparted to the riffle box.

At one end of the riffle box is a large box of peculiar construction, which is stationary, but the connecting pipe between it and the riffle box is elastic, so the vibratory motion of the riffle box may be kept up.

Within the large box, which simply serves as a protector, is a wind box. This consists of a bottom and a top, let into the sides of the big box. Both bottom and top are inclined upwardly toward the front, though the top has the greater inclination, thus making the box lower at the rear than in front. The object of the peculiar construction is that the ore hopper may be placed in a good position so the ore or sand may fall through a slot, slowly, into the current of air passing through the wind box. The feed ore is regulated by suitable devices, and a blower is connected with the front end of the wind box.

heavier particles of ore are caught they will not be carried far before they are lodged below the cleats on the riffles.

In this device the air current is not employed for effecting the actual separation by driving the lighter portions up an incline, which proves too steep for the heavier portion, but for the purpose of providing a means for carrying off such lighter portions as may be kept within its influence by the vibration of the box. For this reason the upper portion of the passage through the box is smooth, and not tortuous, so that the wind will not be directed so much on the riffles and will leave the ore free to settle. The riffles are to prevent the heavy particles, which may be caught by the steady blast passing through above from being carried away. The air passage is diminished or regulated by adjusting the lid of the riffle box.

EXTENSIVE deposits of chloride and horn silver have been discovered in that section of the country lying between the Pecos River and the Rio Grande, Texas.

Inter-Oceanic Transit.

EDITORS PRESS:—I have for many years been interested in the question of inter-oceanic canals. Like most of those who have investigated the subject, my attention was first directed to the narrow Isthmus of Panama, of which I made a personal examination at my own expense, but of too limited a character to furnish much reliable data. I have since studied the data obtained by others and am of the opinion that to engineers having unlimited time and the resources of an empire at their command, the construction of a lockless tidal canal at Panama is possible, but that it is not possible ever to realize one per cent per annum upon the cost of construction. It was supposed that an immense business would be done by the Panama Railway, but ships will not go there for reasons so well understood by navigators that they need not be enlarged upon here. These reasons are permanent and cannot be removed by the construction of a canal. I refer to the calms that prevail off the coast of Panama and the currents of the Pacific ocean.

Reluctantly conceding the financial impracticability of the scheme, I examined the numerous surveys, reports, plans and estimates of all the other proposed routes in the hope of finding some one that I could believe in and advocate. Among them all the Nicaraguan is the only canal that seems to offer any inducement whatever for the investment of capital. This does. This I have believed in, advocated and hoped to see constructed.

Concerning this route, in one of his letters to Rear Admiral Ammen, U. S. N. (that of September, 1881), Sir E. J. Reed, K. C. B., late chief constructor of the British navy, and the highest authority in the world upon all matters pertaining to ships, writes as follows: "It seems to me that the advantage, as between the canals of Panama and Nicaragua, are all on the side of the latter from almost every point of view, while from the point of view of United States citizens, the preponderance of advantage in favor of the Nicaraguan route is enormous." I believe no disinterested engineer can dissent from this opinion, but he goes on to say, "As regards the comparative economy of transporting a ship's cargo by a canal or railway" (having reference to a ship railway), "I am inclined to think a railway would prove the more economical of the two."

The discussion of this opinion at this time in the present state of affairs is unnecessary, and I dismiss it with the remark that upon this point, among engineers and others best qualified to judge, there is diversity of opinion. After obtaining his concession from Mexico, Capt. Eads spent several months in Europe, and, on his return, made certain offers to our government under which American ships were to be transported at greatly reduced rates, at the same time saying, that if the United States did not wish to secure these advantages, he could make terms elsewhere.

The matter was referred to a committee, before whom Sir E. J. Reed testified strongly in favor of the railway, and added, under cross examination, that while it was, in his opinion, of vital importance to the United States to secure the special advantages of the concession made by Mexico, he anticipated no difficulty in securing ample English capital, if Eads would offer the same inducements to England he was then offering to the United States.

Our Government does not appear to have appreciated the significance of this statement drawn from Sir Edward, and the necessity for prompt action in favor of either railway or canal, nor that the lack of such action would greatly stimulate English capitalists and ship owners to secure the advantages of the railway and head off the construction of the canal under the belief that when it became apparent that the railway would first be in operation the idea of a canal would be abandoned. At any rate Congress failed to act in favor of either, and Eads troubled our Government no more. The press ceased to discuss the project, and his scheme soon seemed forgotten.

It is strange that those who knew the tireless energy of the man—that he had never failed to carry out any of his great undertakings; that had seen the written endorsement of his scheme by the leading engineers of Europe and America; that had heard him say that if he could not make terms with the United States he could with England, and heard this corroborated by Sir Edward Reed; that knew he had ceased to urge his scheme upon Congress and gone back to England; it is strange that they should have thought the scheme abandoned, and failed to realize the dangers of procrastination.

We now learn that an English syndicate is quietly engaged in the construction of this railway, with four parties in the field. Capt. Eads (when interrogated) says, "We expect to have the railway in operation within four years."

The stillness with which this enterprise has been conducted is ominous. Silently the work goes on without newspaper parade or blare of trumpets, and with the evident determination of securing to England the control of isthmian transit by acting while others are talking and getting the start of all. Truly "Britannia rules the wave," and she evidently intends to.

The Panama canal, if ever constructed, will

be finished at last by appealing to French pride and for the glory of France, to remain like a good many other things done for glory, a monument of folly. Whether completed or not matters little to the United States, save in a military sense, making her western coast more susceptible of attack from foreign nations.

If the advantages once offered us by Eads have passed irretrievably to England, the construction of the Nicaraguan canal will soon be to us a matter of necessity, admitting neither choice nor delay, and we will be forced in self-defense into that which done voluntarily and at the right time, would have secured for our vessels an advantage over all the shipping in the world; but, delayed until it can be delayed no longer, we will be driven to the expenditure after the investment has been shorn of more than half its value unless, indeed, as appearances indicate, it is the settled policy of our government to sweep our flag from the ocean.

Whatever our wishes and however humiliating to our national pride, owing to our own stupid procrastination, the ship railway will be open before any other route, and under the control and for the special benefit and continued supremacy of British shipping and to the honor and glory of England. This seems inevitable.

A. B. BOWERS, C. E.

San Francisco, May, 1883.

BE CAREFUL MINERS.—Continual association with a danger causes men to grow careless. Put a man in an Indian country, and let him get through a few weeks safely, and his vigilance will relax; put him in a mine, and what seems dangerous to him at first becomes, so far as any precautionary efforts of his are concerned, a safe condition of things. The dangers of mining in Arizona are not greater than elsewhere—not so great as in coal mines—but they are great enough to demand the closest attention of the miners themselves and the constant watchfulness of the superintendents and foremen. Rotten or worn ropes, imperfect splices, faulty timbering, broken ground, premature and delayed blasts, careless co-laborers, uncovered winzes that have been abandoned, all carry their dangers plainly written on them, to the eyes of the practical man, and still they are not avoided as sound sense and the law of self-preservation demand they should be. Miners themselves, knowing their danger, should adopt such precautions as the necessities of the case require. There are no "damages" sufficient to pay a man for the loss of his limbs, and in too many cases there should not be any.—*Silver Bell*.

ANTIMONY.—The Salt Lake *Tribune* says: The Antimony Reduction works at Antimony, on the heads of the Sevier, 120 miles from Juab, are completed, but some part of the machinery, we believe, for crushing, was badly chosen, and it will require a month, perhaps, to replace it. That done, the output of the property promises to be steady, beginning, perhaps, at two or three tons of pure metal per day, and increasing as the demand shall justify. Mr. Clark, of St. Louis, antimony expert, has recently returned from an inspection of the property, and he said to our reporter that he was very well pleased with it. The visit is perhaps likely to result in the infusion of new blood into the concern, although it has proceeded, we should say, with fair speed and average judgment, from its inception. For Utah to supply this country, and possibly foreign countries, with antimony, will be a fine feather in her cap—a good advertisement. It will, without doubt, prove profitable to its projectors. Mr. Anthony Godbe expects it to pay, after getting in full operation, five per cent per annum on a million.

FURNACES BETTER THAN MILLS.—If the Raymond & Ely and Meadow Valley Companies had erected furnaces for the reduction of their ores, instead of mills, they would have been over a million dollars better off. We are led to reason thus, says the *Pioche Record*, partly from the rich bonanza that the Smelting Company is now reaping in Bullionville from the reduction of the tailings of said ores—they having realized some \$300,000 thus far with a twenty ton furnace—and partly from the enormous amount of quicksilver that was wasted by the mill process. It is very true a furnace was erected in Pioche when that camp first came into prominence, but the art of reducing ores by the smelting process was then in its infancy, and the venture could not prove otherwise than a failure.

The citizens of the new county of Garfield, in the western part of Colorado, which was formed by the last Legislature on account of the new carbonate discoveries, have petitioned Secretary Teller to allow the United States troops to remain there for their protection against the Ute Indians.

LIGHTNING passed down a shaft in a coal mine at Wilkesbarre a few days ago, and caused an explosion of gas.

THERE have been forty-five mining districts so far organized in Yavapai county, Arizona. The Walker District is the oldest.

The Point Sal gold mines, says the *San Luis Tribune*, are yielding from one to four dollars per day. The gold is very fine and mingled with black sand, which is found four to eight feet in depth along the beach.

MANY prospectors are traveling toward the new mining district on the Colorado Desert, called the "Poorman's." Several locations have been made there already.

Mining Property.

The troubles in Europe are forcing millions and tens of millions of English capital into this country and Mexico. The rage for purchasing cattle ranches and cattle seems to have become almost a passion with English and Scotch capitalists. It is said that \$200,000,000 have been invested in that kind of property within the past eighteen months. We read two days ago of the transfer of a railroad system in Mexico to an English syndicate, and generally the tendency of money is toward the land which offers the best protection for it. People who have mines and who have not the means to operate them and build reduction works, should make a note of the above facts, and should take advantage of the desire which rages in Great Britain for investments in America.

If mines have a black eye in England now, it is due in almost all, if not all cases, to the rascality of English middle men. They secure an option on a property for a certain sum, and unload it on their countrymen for three times that sum. To do it they make false representations and present false reports; they cause the English company to order five times the machinery that the mine will bear, and the result is disappointment and loss. This fact ought to be understood in England by this time. To sell a mine a man should have an exact report of its condition, maps to make it plain, copies of assays, and samples of every species of ore which the mine contains, with all other important facts. Then the sum asked should be reasonable, and the facts should be guaranteed by the seller, and the sale should be contingent upon the property fully bearing out the description. Of course, it requires some ability and influence to reach the ears of foreign capitalists, but it can be done, and were a few mines disposed of in this way, more sales would follow, for a good mine is better than a cattle ranch after all, and all that is required to make them popular with real purchasers, is to lay real facts before them.—*Salt Lake Tribune*.

VIBRATION OF SOLID BODIES IN CONTACT WITH LIQUIDS.—Recent investigations as to the effect of liquids contained in glass vessels upon the pitch of the sounds produced when the latter are set in vibration have yielded the following results: 1. The geometrical lowering in pitch (ratio of number of vibrations), produced by a liquid contained in a cylindrical glass completely filled by it is less in proportion as the pitch of the empty glass is higher. 2. The arithmetical lowering of pitch with a cylindrical glass of mean pitch is approximately proportional to the reciprocal of the square root of the number of vibrations of the empty glass. 3. The lowering of pitch, when the glass is completely filled is not noticeably dependent on its height. 4. The geometrical lowering of pitch produced in cylindrical glasses of different widths is greater in proportion as the glass is narrower. 5. The arithmetical lowering of pitch with cylinders of different widths is inversely as the square root of the width. 6. The arithmetical change of pitch is inversely proportional to the square root of the number of wave lengths of the sound given by the empty glass contained between the walls and axis of the cylinder. 7. The lowering of pitch is greater as the density of the liquid is greater. 8. It is greater in proportion as the compressibility of the liquid is less.

THE PARADISE MINES.—J. V. McCurdy, from Paradise, says there is considerable prospecting carried on in the district. The force in the Bullion has been increased, and the mine looks well. Nick Frayer is hauling ore from the Live Yankee to the mill. Branan & Marcott have about ten tons of ore sacked at the Rattler that will average about \$1,000 to the ton. Choate & Metille are driving a tunnel to their lead, from which they have taken ore that worked \$280 to the ton at the Bullion mill. Matt Henderson, who had a lease of the Paradise mine at one time, and made as high as \$500 a day clear of all expenses, is back in the district prospecting. He has discovered a ledge on the east side of Spring canyon, which he thinks is the same as the Paradise.—*Silver State*.

The gold belt in Georgia extends from Virginia and North Carolina to Florida and Alabama. It is from 120 to 140 miles wide. Thousands of people support themselves by working in the mines. In one place alone, in Lumpkin county, twenty-six stamp mills are working, each of which employs five to fifty men. Some of these gold mines have been worked for years, and in places the earth is dug away sixty feet. Some of it is very rich in ore. Four hundred acres were sold some time ago for \$5,000,000 to English capitalists. All the mining is done by wealthy capitalists and there are few poor men in the belt. It is a busy place. Good wages are paid and the men are industrious and sober. People are flocking there from the far West, and even from Australia and Mexico.

PHOTOGRAPHY now plays an important part in book illustration, and many books are published which might be called collections of photographs with descriptive letter-press. One recently published by William Patterson, of Edinburgh, under the title of "The Castles and Mansions of the Three Lothians," contains 103 photographs, each about 7½x5.

The Postal Changes.

Rates of Letter Postage Under the New Law—The Proposed Postal Notes.

On and after October 1, 1883, letter postage will be two cents for each half ounce, or fractional part thereof, between all points in the United States. The rate will then be the same as drop letters and all others. No changes have been made in rates on other classes of matter.

On and after July 1, 1883, you can obtain at any money order office, postal notes in sums of \$5 and under by paying a fee of three cents. These notes will be made payable to bearer without corresponding advices. They will be payable at any money order office within three months of the date of issue. After the lapse of that time the holder can obtain the par value only by applying to the Postoffice Department at Washington.

On and after July 1, 1883, you can obtain a postal order for as large a sum as \$100. The present limit is \$50. The fees on and after that date for orders will be as follows:

Not exceeding \$10.....	8 cents.
From \$10 to \$15.....	10 cents.
From 15 to 20.....	15 cents.
From 20 to 30.....	20 cents.
From 30 to 40.....	25 cents.
From 40 to 50.....	30 cents.
From 50 to 60.....	35 cents.
From 60 to 70.....	40 cents.
From 70 to 80.....	45 cents.
From 80 to 100.....	45 cents.

The postal notes will, no doubt, be found more convenient in one respect than the fractional paper currency was, since they can be obtained for any number of cents under \$5. There will also be less liability to loss, by theft, than there was when fractional notes were used for transmission through the mails, especially if the department uses judgment in prescribing the size and form of the notes, and in selecting the paper on which they are to be printed. On the other hand they will be less convenient, in that they can only be obtained at money order offices at a considerable sacrifice of time, especially in large cities. It will be observed that after the first of October the cost of sending any sum under \$5 postal note will be 5 cents—2 cents postage and 3 cents fee.

TOM FITCH, ex-Congressman from Nevada, has invented a process for leaching copper ores, which, it is claimed, will revolutionize the working of low grade ores. We seem to have heard of such claim having been made before in this connection.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANKS, State Mineralogist.]

[CATALOGUE.]

4341. Venus Radiata (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.
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4400. Venus Radiata (Broch.)—Upper Pliocene Fossil, Hills of Asti, Alessandria, Northern Italy.

MECHANICAL PROGRESS.

Valuable Improvement in the Manufacture of Refined Tool Steel.

This invention relates to a new method of manufacturing steel in what is commonly known as the "open-hearth"—that is to say in a Siemens or equivalent furnace—and has for its principal object the production of high grades of steel suitable for tools, etc., for which the more expensive crucible steel has heretofore necessarily been used. In the ordinary method of making steel by the open-hearth process, a bath of molten cast iron is first prepared, and the process consists of decarburizing the molten metal by introducing into this bath wrought iron or other iron low in carbon, or ore, for the purpose of decarburizing the melted metal, which is effected by the melting of a sufficient quantity of wrought iron in the pig iron to reduce the percentage of carbon in the whole mass sufficiently to form steel, the melted product being finally recarburized by the addition of ferro-manganese or spiegeleisen.

It has also been proposed, though we believe without success, to reduce iron ore by decarburization, and to melt it by the aid of carbon in the mouth of the melting furnace, to form a bath of highly carburized molten metal, into which a further charge of reduced ore or blooms may be introduced, which are melted in the bath has been prepared, for the purpose of decarburizing the bath.

The invention, however, of which we are writing, differs widely from both of these in that it is a carburizing and not a decarburizing process, and consists in melting Swedish iron of the finest grades or pure charcoal blooms or steel low in carbon, on the surface of a charge of carbon in an open-hearth furnace, so that the melting metal may trickle down through the carbon, and thereby become carburized to the required degree to form steel. This process avoids the impurities always present in steel produced by the employment of pig iron, and enables it to produce a high grade of refined tool steel suitable for the best purposes, and fully equal in quality to the best English and American brands, which we believe cannot be accomplished by any of the previously-known processes. This valuable patent is used exclusively by the Bolton Steel Company, of Canton, N. H., where it has been in successful practice for several years, producing a quality of steel remarkable both for its purity and uniformity.—*Age of Steel.*

STEEL VS. IRON.—In advocating the use of high qualities of steel, and enumerating the advantages to be gained by employing it, says Percival Roberts, Jr., the fact is frequently lost sight of that this superior metal is made from the highest grade of pig, obtained with the greatest care from the purest ores, and that the succeeding processes are worked out with the aid of the most improved plant. The metal is followed through all details of manipulation with the most thorough inspection and rigid chemical and mechanical tests.

Material thus obtained is compared with wrought iron made from anything and everything. No chemist mixes the charge or analyzes the product, but a puddler is left to guard the interests at the most vital stage of the process. It is his aim to produce the greatest weight, with the least labor, in as short a time as possible, and with such work no one can blame him. It is not astonishing that under such conditions iron is so much inferior in its physical qualities to steel. Even taking the same grade of pig metal for the manufacture of wrought iron as is now used for steel, the mild grades of the latter suitable for structural purposes, will, no doubt, give higher results by mechanical tests, but the difference between the two will not be as great as many are apt to think.

IN THE NEW ALLOY.—In the new alloy on copper, iron and zinc, considerable difficulty has been experienced in securing a uniform admixture of the iron. A London experimenter said to have overcome this by his method of introducing the iron into the mixture of zinc and copper. When ordinary wrought iron is introduced into molten zinc the latter readily dissolves or absorbs the former. The exact point of saturation or the proportion dissolved or absorbed varies with the temperature at which the molten zinc is maintained during the process, and it is by carefully ascertaining and controlling this temperature that a perfectly uniform product has been obtained. The metal thus produced, and to which the name of Delta metal has been given, is stated to be as much superior to brass as phosphor-bronze is to gun metal, or as steel is to iron. It possesses great strength and toughness, and samples cast in and give a breaking strain of twenty-two tons per square inch.

AMERICAN LOCOMOTIVES AND CARS.—It is said that from ninety-five to ninety-eight per cent of all of the railroad locomotives in use in British colonies were manufactured in the United States, and that all of the continental European countries have their roads equipped to a greater or less extent from the same source. Within the last ten years the exportation of railroad locomotives from the United States has aggregated some \$12,000,000 and the passenger coaches \$40,000,000.

Progress of Electrical Invention.

The *Age of Steel* remarks that, notwithstanding electricity has made rapid strides as a human, its progress as a motor has been slow and laborious. It is true that electric railroads are in operation in France, Germany, England, Ireland, Austria and in this country, but it is equally true that their economy, compared with the ordinary railroad with its steam motor, has not been demonstrated; on the contrary, we believe experiments have shown that the operating expenses of an electric railroad are considerably in excess of those of any ordinary railroad. But whether this will always be the case is a question upon which, as yet, it is not safe to hazard an opinion. Until within very recent years, electricity was unknown to the public except in connection with atmospheric disturbances of the "thunder and lightning" order; and in the scientific world it was best understood by chemists. To-day, however, a class of young men are growing up who are making the study of it a specialty, and newspapers are being established in every civilized country in the interest of electricity and electricians. Under such circumstances it is not unreasonable to assume that electrical invention will spread far beyond its present limits—and mayhays the economy which is so eagerly sought for in the utilization of the fluid as a motor will be found. It is too early to condemn its employment as a motor let us wait and watch and wonder.

Prof. Henry Morton, of the Stevens Institute of Technology, in New York, in an address delivered there a few days ago made the assertion, the truth of which he demonstrated by experiments, that by a very simple contrivance, and at a very slight expense, electricity as a motive power could be used economically, not merely to propel street cars, but to drive all sorts of machinery. He stated that the energy that might be stored in a box in size equivalent to a cubic foot, was sufficient to drive a loaded street car from one end of that city to the other.

MOLDING PATTERNS.—A writer in the *Mechanical World* says: For patterns which have to be repeatedly molded in damp sand it is advantageous to mix with the glue some good thin drying oil in the proportion of about one of oil to four or five of water. The oil should be added to the glue and well stirred in while it is hot. (Glue so made is scarcely affected by moisture and makes a good sound joint, although it is not quite so strong as glue mixed in the ordinary way. Good glue should be clear, transparent and of a light brown color, and the best way to make it up is to break it up into small pieces and soak it for twelve hours or so in as much water as will cover it, and melt it in an ordinary glue pot, letting it simmer gently for one or two hours. As I have assumed that the glue was required for pattern making, I should state that it is always advisable—no matter what kind of glue is made use of—in order to thoroughly protect the patterns from moisture, to coat them with good oil paint.

THE STEAM ENGINE.—Taking the best types of engines of to-day as a starting point, we must depart in the following directions: We do not particularly need to increase the efficiency of the boiler as an evaporator, but we must increase its ability to withstand pressure without increasing its cost. We must decrease the friction of the engine and of the machinery of transmission to the point where the useful work is delivered. We must produce better vacuums in the condenser, and diminish its cost. We must diminish the cost of the engine. We must diminish the cost of the attendance on engines, boilers and machinery, and of lubrication. We must increase the durability of engines, boilers and machinery. Coal is too cheap even now to admit of increased economy of it at the cost of increased outlay plant and attendance.

AN EXPERT WORKMAN.—A Connecticut paper tells of a machinist in that State who is so expert a workman that he has cut an ordinary sewing machine needle in two lengthwise, drilled holes lengthwise through the halves and remitted them so that the line of their division is not observable; all of which indicates a steady hand, an observant eye, nice workmanship and good and proper tools. That man ought to command high wages from manufacturers of delicate apparatus.

TRACTION INCREASES TESTS.—A series of tests were recently made in St. Louis with M. A. Dees' traction increaser, which demonstrated, according to the report of the testing committee, that 16,800 pounds had been added to the weight upon the driving wheels of the locomotive to which the device had been attached. The device is constructed so that it can be thrown "off" or "on" at pleasure, enabling the engine to throw a part of the weight of the tender upon the driving wheels of the engine at any time he may need it.

The largest rolling mill shears in the U. S. were set up on the 3d inst. by the Judson Manufacturing Co. at Oakland, in this State. These shears were manufactured in the Judson works. The weight is eighteen tons, and the shears can cut a bar of iron four and a half inches square. Tack plates are now rolling out at the works, and in a few days large quantities of merchants' bar iron will be rolled.

SCIENTIFIC PROGRESS.

Meteoric Iron.

One of two blocks of meteoric iron in the possession of the British Museum, and found in Victoria, Australia, in 1854, was recently studied from a chemical and mineralogical point of view by Dr. W. Flight, of that museum. At the time of finding the mass, which weighs somewhat over three tons, only a small portion projected along the soil, the remaining portion being imbedded in tertiary sandstone overlying basalt. Dr. Flight states that the entire mass consists of metallic minerals and is destitute of silicates. In the course of the analysis the iron was found to contain numerous minute brittle, strongly magnetic, apparently square, prisms, which form about one per cent of the mass. These prisms were slowly and with difficulty acted upon by hydrochloric acid, but readily dissolved in nitric acid. Scales were observed lying on the faces and between the plates of iron crystals, being in the form of equilateral triangles, and having the thickness of stout writing paper; they were, moreover, pliant, strongly magnetic, and of a pure white color. Analysis showed the mass to contain 70.138 per cent of iron and 29.744 per cent of nickel, and Dr. Flight proposed for it the name Edmondsonite. The analysis of a brittle magnetic powder, which easily dissolved in nitric acid, gave the formula (Fe₂ Ni₁₇ P. A large brass-colored, oblique crystal, showing perfect basal cleavage, dissolved readily in *aqua regia*, but was only slowly acted upon by hydrochloric or nitric acid alone, and gave, on analysis, the formula (Fe₉ Ni₂) P₂. Another crystal which was found was apparently a square prism, having brilliant metallic sides, with a dark, almost black, center. Its analysis gave the formula (Fe₇ Ni₂₈ P. Graphite occurred occasionally in this meteorite, both in nodules and in plates. The iron was also examined for occluded gases, and carbonic acid, carbonic oxide, hydrogen, nitrogen and marsh gases were found.

THE ARTIFICIAL AURORA BOREALIS.—Some additional points of interest in regard to the artificial aurora, to those we gave in this column last week, will be found in the following paragraph from the *Scientific American*: Laboratory experiments have been frequently resorted to to produce the aurora in miniature, and the resemblance to the original has been extremely close, but an artificial aurora on a large scale and with no electrical machinery has lately been effected by Prof. Lemstrom. He selected a station just within the Arctic circle, in North Finland, where there were two mountains close together and having altitudes of 2,600 and 3,600 feet. In accordance with the well-known fact that electricity gathers upon points, two hills having clearly defined conical summits were selected. He believed that aurora was the result of an endeavor on the part of certain forces to establish an equilibrium, and assumed that electricity was passing from one hill top to the other. Reasoning that if by any means this interchange could be hastened the effect would become visible, the summits were connected with their bases by a network of copper to serve as a conductor. Immediately an arch of the aurora appeared, estimated to be at least 360 feet above the top. An examination of the currents produced in the wires showed them to be positive. The spectroscopic clearly revealed the well-known lines of the aurora. Although the display was only of short duration, there could be no doubt of its genuineness or of the success of the experiment.

AN INTERNAL MITE IN FOWLS.—Prof. Thos. Taylor, Microscopist of the Department of Agriculture, had occasion recently to dissect a sick chicken, and he found that all parts of the lungs, the brouchie, and the linings of the thorax and abdominal cavities were covered more or less thickly with a mite. An examination we were requested to make showed it to be in all respects identical with *Cytolichus sarcopoides*, Megnin. This parasite is known in Europe to inhabit the air passages of gallinaceous birds, giving the transparent and membranous linings of these passages the appearance of gold beater's skin speckled with flour. It is likewise found in the bronchial tubes and their divisions, and even in the bones with which the air sacs communicate. Megnin believes that while the mite may be extremely numerous, so as to cause mucous irritation and induce asphyxia and congestion by obstruction of the bronchia, and that birds may thus die, yet it is incapable of causing, as Gerlach and Zundel believe, enteritis or inflammation of the peritoneum.

FOOD FOR THOUGHT.—Mr. Richard Proctor makes a very curious suggestion in a recent number of his paper, to the effect that the spreading of so large a quantity of iron upon the surface of the earth, as modern sciences is doing, is likely, in the future, to exercise a very decided influence of its own upon electric currents and magnetic storms, and in this way to exercise a very material meteorological influence. The network of railways and the substitution of iron for wood all over the country is going on steadily and in a rapidly increasing ratio. Even the Western prairies are being netted in all directions by wire fences, and in calling attention to this fact Mr. Proctor thinks that here is a problem that science will shortly be called upon to solve.

Thorium.

The metal thorium, the existence of which was so long doubted by chemists, has recently been isolated and its properties carefully studied by Mr. Nilson. The metal was first discovered by the eminent Swedish chemist, Berzelius, who detected a new earth in a Norwegian mineral which he called "thorite." The earth was called "thoria," from which is derived the name of the metal, thorium. Nilson's investigations have modified to some extent the statement of the properties of this rare metal as generally laid down in text books. He succeeded in isolating it by reducing the double chloride of potassium and thorium by treatment with dry chloride of sodium and metallic sodium. This mixture was heated to a low red heat in a wrought-iron cylinder furnished with a piston to make it air-tight. By this means the metal was obtained in a gray, lustrous powder, which under the microscope was seen to be composed of six-sided lamellar crystals. The metal was found to be unaffected in the air, even when heated to a temperature of from 212 to 248 F. Heated to nearly redness, however, it burns with a bright light to snow-white oxide. Burned in chlorine gas it forms a white sublimable chloride, with the evolution of heat and light. It is unaffected by water and by hydrated alkalis. Diluted sulphuric or nitric acid is stated to cause a feeble evolution of hydrogen gas. Concentrated sulphuric acid causes a slow formation of sulphurous acid. Dilute hydrochloric acid attacks and dissolves the metal readily, as does likewise *aqua regia*. Thorium has a specific gravity of 10.99 to 11.01. It is tetravalent, and its atomic weight is 232.40.

GENESIS OF A NEW WORLD.—On a beautiful summer's night, August 22, 1794, Jerome and Lefrancais de Lelande noticed a star in Aquarius, which they estimated of the seven and one-half magnitude. Six years later they thought it of the eighth magnitude. In appearance it resembles a star which is not exactly in the focus of the telescope. Herschel had observed it in September, 1782, and recorded it as an admirable planetary nebula, very brilliant, small, and elliptical. Lord Rose and Lassell perceived that it was surrounded by a ring, which gives it somewhat the appearance of Saturn. The spectroscopic observations of Huggins indicate that it is a gaseous mass, in which nitrogen and hydrogen predominate. Most of the other planetary and annular nebulae give similar results. In 1871 and 1872 Brunnow, the Irish Astronomer Royal, measured its parallax and concluded that its distance is more than 404,000 times as great as that of the sun, and its diameter is probably greater than that of the entire solar system. This would make its volume more than 338,896,800,000,000,000 times as great as that of the earth. We have thus, before our eyes a new system, which is probably undergoing the process of condensation through which our sun and its attendant planets passed hundreds of millions of years ago.—*L'Astronomie.*

ON THE AMMONIA IN THE AIR AND IN RAIN, ETC., AT GREAT HEIGHTS.—It has long been known that the small traces of ammonia in the air are carried down to the soil by meteoric precipitates, and Schlosing has shown that it is fixed directly by the oxidizing action of the soil and leaves. In connection with these investigations he also called attention to the sea as the great reservoir which supplied the air with ammonia. He devised an ingenious method, which enabled him to operate on large quantities of air, and with it he examined the currents of the air circulating near the ground. Recently Muntz and Auber (*Comptes Rendus*, xcv., 788) have been estimating the amount of ammonia in the air on the top of Pic du Midi, which is 2,877 meters (nearly two miles) above the level of the sea. The tests were made morning and evening in a laboratory especially erected for the purpose. The average was 1.35 milligrammes in 100 cubic meters. These numbers, although so extremely small, do not differ perceptibly from those obtained at the earth's surface. They also made thirteen analyses of rain, seven of snow, and five of fog. In rain water they found between 0.34 and 0.80 milligramme per liter, in fog 0.19 to 0.64 milligramme, and in snow 0.06 to 0.14 milligramme of ammonia per liter.

VIBRATORY MOVEMENT OF BELLS.—M. Mathien, a French experimenter, has recently studied the vibrations of bells, considering the case of an ordinary bell in which the thickness in any meridian increases from summit to base. The essential difference between the vibratory movement of a bell and that of a plane plate is that, while in the latter the longitudinal or tangential movement and the transverse movement are given by independent equations, and the normal and tangential motions in the former are given by three equations which are not independent. The pitch of the notes of a bell does not change if the thickness varies in the same relation throughout every part, since the terms depending on the square of the thickness may be neglected, at least for the graver partials. It is impossible to construct a bell so that it shall vibrate only normally, and with a hammer the tangential vibrations are of the same order as the normal vibrations. A purely tangential motion can be realized only with a spherical bell of constant thickness.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQUENT SALE.	SECRETARY.	PLACE OF BUSINESS.
Alhambra M Co.	Nevada.	16.	7. May 7. June 11.	July 2. F J Schwarz.	324 Washington st
Alpha S M Co.	Nevada.	31.	25. Apr. 10. May 15.	June 4. W H Watson.	302 Montgomery st
Best and Belcher M Co.	Nevada.	26.	50. May 8. June 13.	July 1. W Willis.	300 Montgomery st
Belcher M Co.	Nevada.	32.	25. Apr. 21. June 13.	July 12. Crockett.	327 Pine st
Belmont M Co.	California.	7.	25. Apr. 30. June 4.	June 25. C C Harvey.	309 California st
Bodie T and M Co.	Nevada.	27.	25. May 1. June 4.	June 25. C C Harvey.	319 California st
Bullion M Co.	Nevada.	7.	20. May 7. June 11.	July 5. J M Brazell.	328 Montgomery st
Seco Copper M Co.	California.	1.	5. Apr. 27. May 31.	June 20. D Buck.	309 Montgomery st
Challenge Con M Co.	Nevada.	2.	10. Mar. 27. May 2.	May 23. W E Dean.	309 Montgomery st
Chollar M Co.	Nevada.	11.	50. Mar. 27. Apr. 30.	May 21. W E Dean.	309 Montgomery st
Con Imperial M Co.	Nevada.	19.	5. May 2. June 8.	June 27. W E Dean.	309 Montgomery st
Con Pacific M Co.	California.	6.	15. Mar. 22. Apr. 30.	May 23. F E Lutz.	320 Sansome st
Carborea M Co.	Mexico.	7.	10. Apr. 20. May 21.	June 6. F M Hall.	327 Pine st
Dry S M Co.	Nevada.	12.	30. Mar. 12. Apr. 10.	May 21. F M Hall.	300 California st
Elko Con M Co.	Nevada.	25.	10. Apr. 10. Apr. 15.	June 1. F Sperling.	300 California st
Golden Fleece Gravel Bl Co.	California.	29.	35. Oct. 29. Apr. 29.	May 28. June 16. F Schirmer.	785 Folsom st
Hopewell Con M Co.	Nevada.	2.	1/2. May 2. June 6.	June 4. F S Monroe.	304 Montgomery st
Imperial Con M Co.	Nevada.	18.	10. Apr. 10. May 14.	June 4. H A Charles.	419 California st
Lady Washington M Co.	Nevada.	3.	5. Apr. 21. May 24.	June 3. W H Watson.	302 Montgomery st
Loreto M and M Co.	Mexico.	4.	10. Apr. 27. May 28.	June 18. H G Jones.	327 Pine st
Mount White M Co.	Nevada.	14.	25. Mar. 2. May 2.	May 31. J J Scoville.	300 Montgomery st
Moutn Potosi M Co.	Nevada.	9.	25. Apr. 2. May 7.	May 28. J H Sayre.	330 Pine st
Napoleon M Co.	California.	7.	10. Mar. 13. May 10.	May 31. J Smith.	309 Montgomery st
Ophir M Co.	Nevada.	44.	50. Apr. 26. June 1.	June 2. C C Elliott.	309 Montgomery st
Pleasant Valley M Co.	California.	1.	15. May 11. June 6.	May 10. C K Elyott.	327 Pine st
Scorpion M Co.	Nevada.	16.	10. Mar. 29. May 2.	May 31. G R Spinker.	310 Pine st
Sierra Nevada S M Co.	California.	10.	01. Mar. 10. Apr. 30.	May 25. R N Van Brunt.	318 Pine st
Union Con M Co.	Nevada.	22.	50. May 2. June 6.	June 26. J M Buffington.	309 California st
Utah S M Co.	Nevada.	44.	1. May 16. June 20.	July 9. G C Pratt.	309 Montgomery st
Wales Con and S N Co.	Nevada.	1.	25. May 14. June 15.	July 16. J H Applegate.	320 Sansome st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

OTHER COMPANIES NOT ON THE LIST											
Buchanan G M & M Co.....	California..	2..	05..	Mar	30..	May	2..	June	1..	P J Sullivan.....	121 Post st
Lima Con S M Co.....	Arizona..	5..	05..	Apr	4..	May	15..	Jun	5..	R D Hopkins.....	436 Montgomery st
Lucky Hill Con M Co.....	Nevada..	2..	10..	Apr	2..	May	4..	Jun	4..	H A Unrich.....	37 Ellis st

MEETINGS TO BE HELD

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Adams Hill Con. M. Co.	Cal.	D. A. Jennings	401 California st.	Annual	May 21
First Play Con. M. and M. Co.	Cal.	W. C. Selin	220 Montgomery st.	Annual	May 25
Morgan M. Co.	Cal.	C. T. Tilden	806 Market	Annual	May 26
Pacific M. Co.	California	R. L. Shainwald	320 Sansome st.	Annual	May 23
Pacific M. Co.	California	J. W. Burling	413 California st.	Annual	May 23
Silver Hill M. Co.	Nevada	W. E. Dean	300 Montgomery st.	Annual	May 18
W. Branch Feather River M. Co.	Cal.	A. B. Paul	328 Montgomery st.	Annual	May 24

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY	LOCATION	SECRETARY	OFFICE IN S. F.	AMOUNT.	PAYABLE
Bulwer Con M Co	California	W Willis	309 Montgomery st	.05	Apr 12
King M Co	Arizona	D C Bates	309 Montgomery st	.25	May 28
Jackson M Co	Arizona	D C Bates	309 Montgomery st	.10	Apr 17
Kentuck M Co	Nevada	J W Pew	310 Pine st	.10	May 18
Navajo M Co	Nevada	J W Pew	310 Pine st	.25	May 14
Northern Belle M & M Co	Nevada	W Willis	315 California st	.50	May 16
Standard Con M Co	California	Wm Willis	309 Montgomery st	.25	May 12

Table of Highest and Lowest Sales in S. F. Stock Exchange.	Sales at San Francisco Stock Exchange. THURSDAY, A. M., MAY 17. AFTERNOON SESSION.
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[illegible]

NEVADA PLACER MINES.—The *Pioche Record* of last Saturday says: Water is to be brought into the Osecola gold mines this season. Messrs. Godbe and Hampton, while at Bullionville the other day, who own 520 acres of patented placer ground in Osecola district, said that they had completed arrangements for bringing water into that district. They had not yet decided as to whether they would flume the water or bring it in with pipes, but thought they would pipe it. This will make Osecola bloom with industry, and the gold that the rich gravel will yield will pay handsome returns to the enterprising gentlemen for their trouble and labor. The money for carrying out this project was advanced by the late Trenor W. Park.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Amador *Ledger*, May 12: A clean-up has been made at the Mahoney mine, and the hearts of the boys will be made glad to-morrow with a pay-day. The repairing of the shaft of the Amador Con. is completed, and sinking operations were commenced on Friday. The intention, I am told, is to sink 300 ft before stopping, and this work will take about all summer.

El Dorado.

ENCOURAGED MINERS.—*Mt. Democrat*, May 10: At the Spring Tunnel mine, Georgetown township, which is being worked by Messrs. Hewett and Savage of Oakland, they cleaned up last week after a run of six days, with results so satisfactory that the owners have determined to run night and day henceforth.

ANOTHER MINING CONTRACT.—A contract has been let for sinking 50 ft deeper on the Pleasant Valley ledge, and a number of experienced Cornish miners have come over from Plymouth, Amador county, to do the work. This is a large ledge—from five to eight ft, from its first discovery and in all of its workings it has turned out uniformly high grade ore, and has constantly improved as greater depths have been reached. All old miners who have examined it concur in the opinion that the Pleasant Valley mine has a long and prosperous career in store.

THE EUREKA MINE.—E. E. Cheek has charge of the Eureka mine, located in the suburbs of Georgetown, and is about to erect a mill which will have a capacity for crushing 60 tons per day. This mill has been built at the East, and is now on its way out here. Mr. Cheek has lately discovered a ledge running parallel with the main ledge of the Eureka, which from present indications is exceedingly rich.

A PAYING MINE.—At the Josephine mine, Georgetown township, the mill is being run day and night on high-grade ore, and it is now apparent that they will have to add 10 more stamps to the 10 now at work.

WONDERFULLY RICH ORE.—At Adlerson's store may be seen a number of large samples of the ore recently struck in the Mount Hope mine, near Grizzly Flat, to which strike was made brief reference in our last issue. It is unlike any ore we have seen from any other lode in the county. It is all a mineral of an exceedingly dark lead color. It is lined with small pieces of iron an inch thick, of tellurium, imbedded in sulphurets. Test assays made in San Francisco have yielded from \$180 to \$285 per ton. This ore was struck on the 200 level, about 60 ft from the Flag Staff line. They have explored it for 20 and 30 ft, sufficient to demonstrate that there is a large body of it. Of course this ore cannot be worked by the ordinary wet process without enormous waste, as the gold is in exceedingly fine particles, closely combined with the tellurium and sulphurets, and a large proportion—probably nine-tenths—would float off. Therefore Supt. Lyon must erect smelting works or ship his ore to some point where it can be smelted, or content himself with but a small portion of the gold it contains.

Invo.

THE KEYNOT. - Inyo *Independent*, May 12: Assessor Irwin has returned from an official visit to the Beveridge country. He says the Keynot mine is yielding plenty of free gold ore, which works from \$35 to \$40 per ton, at the new Lasky mill. The yield of gold bullion is from \$1,000 to \$1,200 per week. The McEvoy mill is idle for the present.

Mono

ILLINOIS.—Homer *Mining Index*, May 10: This claim is situated on the mountain side west of Mono Lake, and has heretofore been briefly alluded to. It is owned and is being developed by Wm. L. Callahan and E. F. Isbell. A surface crosscut 14 feet in depth shows a strong vein of two feet of free gold ore inclosed in black slate country rock, with some porphyry casings. The ore yields handsomely in fine gold on being crushed and panned. The owners have a torrent of water crossing the ground, and a dense forest of nut pine timber.

GRIZLY.—The tunnel in the Grizzly, situated a few hundred yards above the May Lundy mill, has followed in the vein a distance of 155 feet, at which point a crosscut six feet to the eastward fails to show the hanging wall, though it has reached a heavy clay seam rich in gold. Some of the ore encountered in the crosscut is also very rich in free and fine gold. The tunnel is still 15 feet short of the face of the bluff, where it is confidently believed the vein will assume greater solidity, but is being vigorously pushed.

Nevada.

QUARTZ MINES.—*Nevada Transcript*, May 16: The Nevada City mine is looking better now than ever before. They are doing a large amount of dead work, and in fact their aim seems to have been to thoroughly open the mine before attempting to make it a bullion producer, which they might do at any time were they so disposed. They have now reached the 600 ft. level and there they found a splendid three foot ledge, which looks as well as any

San Bernardino.

MAMMOTH.—*Calico Print*, May 12: The work in this mine has been partially suspended, the force of men being employed in opening up the road in Wall street canyon, which has now been completed to the mine. A tramway and car track 600 feet long extends from a dump near the lower tunnel to a 200-ton ore bin in the canyon below. Preparations are being made to extract a great deal of ore. The force of men will be increased; and a large quantity of ore will be taken out and shipped to the mill every day. Some good ore is being taken out, and the prospects of the mine are as bright as ever.

SILVER KING.—Work in this mine is still progressing, and the yield of bullion is increasing, owing, to a certain extent, to a more careful assortment of the ore. Another ore bin that will hold 200 tons has been built a short distance from the superintendent's office. Mr. Al. Waitt has been appointed foreman of the mine.

KEARSAGE.—Three men are at work on this mine and judging from the character of the ore taken out it is a valuable piece of property that is destined to

Mining Share Market.

Mining stocks have been quite active for a few days and the market has a firmer tone than has been noticeable for some time past. This is probably due to reports from the Comstock, where, though nothing definite has been found, there seems to be a general feeling of favorable expectancy. The *Enterprise* says that at the north end indications are very flattering. At several points one might be taken out, but there are those who are not in favor of doing anything until the time arrives when a "very big thing" can be done. Down in the middle mines there is great activity in all operations. With the new air they will get from the 2400 level through the winze they will be able to do some wonderful work. The same connection will be of great use to the Savage, Hale & Norcross, Chollar and other mining companies in that neighborhood.

At the south end things are looking up well, and in another week or two some changes of great importance will be seen.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports :

Hanauer, May 8th, \$1,890; Al'cee, 8th, \$28,028; Horn Silver, 8th, \$15,000; Bullionville, 8th, \$2,925; Ontario, 8th, \$9,183; Hanauer, 9th, \$2,000; Horn Silver, 9th, \$9,000; Ontario, 9th, \$4,900; Horn Silver, 10th, \$6,000; Bullionville, 10th, \$3,020; Ontario, 10th, \$4,737; Horn Silver, 11th, \$5,000; Bullionville, 11th, \$2,523; Ontario, 11th, \$4,456; Moulton, 13th, \$4,956; Ontario, 13th, \$4,454; Mt. Diablo, 7th, \$7,650; Northern Belle, 7th, \$7,456; Standard Con., 7th, \$16,743; Odessa, 10th, \$2,910; Alhambra Con., 10th, \$1,802; Mt. Diablo, 10th, \$5,077; Head Center, 11th, \$8,800; Standard, 7th, \$14,724; Northern Belle, 10th, \$6,485; Navejo, 14th, \$15,000; Gold Hill, 12th, \$9,000; Con Wyoming, 15th, \$9 337; Bodie Union, 15th, \$1,830; Contention, 12th, \$46,000; Bodie Con., 15th, \$5,463.

SOMEBODY owning a mine in Mexico, telegraphed to Greenville, Plumas county, in this State, for five miners, and the men have started for their destination. This seems a long way to send for miners, but good men are always in demand.

yield its owners a handsome fortune each. A shaft is down 25 ft from which ore of a high-grade is being extracted. The ore is carefully assorted, and the four or five tons sacked on the dump assays on an average up in the hundreds.

INVISIBLE.—This mine is making a fine record. Ever since it was opened it has netted excellent returns. There are six men at work in the mine, and the tunnel and cuts are showing up beautifully. Eleven tons of ore were taken to the Silver Odessa mill at Hawley's station within the last week. John Lane is now foreman of the mine.

BORAX.—The excitement in prospecting for borax has not decreased. Monuments are again springing up all over vacant lands like office seekers just before election. Men start out from front on a "dog trot," leaving in their wake rows of monuments, and do not slacken their pace until the shades of night prevent further operations. Inside of a couple of days two men located 66 claims, and one was located at that. If men work the silver mines with the same energy that they cover the country with monuments, the camp would soon be booming. Judging from reports, some fine borax prospects have been located, and some more sales are about to be made. F. M. Neel is about to receive \$2,000 for some property, and H. B. Stevens has bonded some claims for \$8,000. It is reported that reduction works will be put up to prepare the borax for the market. The mines are so near the railroad that the expense of extracting and shipping it will be considerably less than that which attends the business now monopolized by Cadenan & Co. While searching for borax and analyzing the same, other minerals are found. Salt, alum, Glauber's salts, potash, soda, gypsum, lime and several other substances are found, some of which may prove to be very valuable when it is determined, by experts, the uses to which they can be put.

Sierra.
THE RICH STRIKE IN SAILOR RAVINE. *Sierra Tribune, May 11:* In last week's issue we mentioned the fact that an important find had been made in the old Page mine, located in Sailor ravine, two miles north of this place. The Page ledge was taken up by Messrs. Baker & Cowden three years ago. Previous to that time it had been located by parties who took out several thousand dollars at a depth of only 15 ft from the surface. After locating the mine, Cowden & Baker prospected along the croppings 1200 ft and found a fine prospect the whole distance. A tunnel was then started and run in 20 ft on the vein. The ledge at this point is two and a half feet wide. About four inches of this is enormously rich, as high as \$200 having been washed out of one pan of dirt, the balance of the ledge shows fine milling ore. The formation of the vein is porphyry and slate, coarse north and south. The lead is supposed to be an extension of the Good Hope, lying one mile south. The location of the Page ledge is such that it can be worked to a depth of several hundred feet by tunnel, which is a very great advantage. Mr. Baker was down from the mine on Tuesday and called at this office. He exhibited several pounds of ore taken from the ledge, that was literally alive with gold. These gentlemen have undoubtedly found a bonanza.

GOOD YIELD.—*Mt. Messenger:* Thirty-four thousand dollars was realized from the last two months' crushing at the Margaret Quartz Mine, and the probable yield this month, it is believed, will be twenty-two thousand dollars.

ONE hundred and eighty ounces a week is being taken out of the Ruby Gravel Mine. Last Monday, sixty thousand dollars' worth of very rich quartz was taken out of the Rainbow.

J. B. YORK cleaned up with his astral in his quartz ledge, this week, four hundred and fifty dollars, result of thirty-three days' run from fifty-three tons of ore.

DERBEC.—The Derbec gravel mine is coming to the front as a paying property. Since Sept. Denon took hold he has paid a debt of \$80,000, run 3,000 ft. of outside tunnel, and settled all the expenses of the mine working through a shaft. Those who have visited it say that this is the richest dirt mine they ever saw.

PHOENIX MINE.—The Phoenix Quartz Mine, at Sierra City, under the control of Mr. Deidesheimer, started up on Wednesday. The first work to be done is sinking a shaft. After a short time forty or fifty men will be put to work. A mill will also be built at no distant day. The Phoenix is a thoroughly prospected mine, and will give a good account of itself.

TUOLUMNE.
THREE SHIFTS.—*Tuolumne Independent:* Colby is going after the Divoll bonanza in good shape, and working three shifts. He calculates where the next gold-bearing strata makes into the vein—as indicated by the lay of the "country"—he will "get it" as big as ever. Anyhow, the "fat" of the "Big Nugget" claim will go in to haste the golden goose of the bonanza.

NEVADA.
Washoe District.

UTAH.—*Enterprise, May 12:* There will soon be active prospecting on the 2500 level, and the indications for finding ore are excellent.

CALIFORNIA.—The C. & C. winze, which is to go to the 2000 level, is progressing well, and the south drift, with which the winze will connect, is being pushed ahead as rapidly as possible. This will be a very important connection. From near this point will take place the reopening of the old ore bodies shut up at the time of the fire.

HALE & NORCROSS.—Although every one is confident that the recent find in the Hale & Norcross is but the top of a big body of ore, yet no one can say where the deposit may end. While most of those who have seen the deposit are loud in its praise there are those who say nothing is certain until shown up.

YELLOW JACKET.—Are extracting about 140 tons of ore per day, with an improved appearance in the mine. The prospecting sections are showing well. To the northwest is coming in a body of ore never before seen in the mine, and the existence of which had not heretofore been suspected.

CON. VIRGINIA.—On the 2500 level work has been discontinued in the face of the southeast drift, in order to allow the hot water to drain out at the face.

BEST & BELCHER.—The northeast drift on the 2500 level is cutting occasional streaks and bunches of quartz that give low assays. The ground is of a very favorable appearance.

UNION CON.—The winze at the end of the east

crosscut on the 2500 level is down some 20 ft. in a very favorable formation.

SILVER NEVADA.—The drift north on the 2500 level found a very favorable streak of ore, which, at that depth, is liable to develop into a good body.

CITIZEN.—The drift west cut some very rich ore, but, at the same time, the flow of water was such that it was not considered judicious to push forward, therefore the drift has been for a time discontinued.

NORTH GOLD & CRY.—During the week had some trouble with a four-foot streak of soft rock, but have timbered all up solid, and are now making excellent progress beyond the bad spot.

CROWN POINT.—The old upper levels still hold out well, and the usual amount of low-grade ore is being extracted and sent to the mill.

Columbus District.

NORTHERN BELLE.—*True Fissure, May 12:* The crosscut to the east from the end of the drift below the fifth shaft level, has been advanced 11 ft, its total length being 38 ft. The crosscut to the south from the level above, at a point 200 ft from the shaft, has been extended 18 ft, the total distance run to date being 54 ft. Its face continues to show streaks of black sulphurets, yielding assays as high as \$60 per ton. The slope at the eastern end of the ninth level has improved materially, and looks promising for the future. The daily output of ore has been about 54 tons. Both mills are running as usual and doing good work. Five of the stamps of mill No. 2 have been engaged a part of the week on ore from the Columbus Con. mine. A shipment of bullion amounting to \$13,941.52 was made on the 10th instant.

MOUNT DIABLO.—The intermediate drift below the third level, and west of winze No. 1, is giving a small amount of \$50 ore. The slope from winze No. 2 is yielding considerable \$95 ore from a two-foot ledge. A winze has been started on the ledge below this slope and is now showing eight inches of \$80 ore. The slope above west drift from Callison winze is looking well and turning out a good deal of ore. The ore is opening to the west as it is extended upward. The western part of the slope shows about two feet of \$75 ore, and the eastern end shows some 18 inches of \$65 ore. Two shipments of bullion were made during the week, one of \$5,681.06 on the 3d instant, and one of \$7,649.96 on the 7th instant.

Lewis District.

BULLION.—*Elko Free Press, May 1:* Four bars of Lewis bullion were received in Elko Tuesday afternoon. They were from the Betty O'Neal mine at that place, and came up on the freight train, consigned to the bank. This makes seven bars received from that mine during the past two weeks, and ought to be enough to pay off the miners and mill hands. The bullion was shipped to San Francisco Wednesday morning.

ARIZONA.

BULLION FROM WALKER.—*Prescott Courier, May 10:* Guilford Hathaway, the jolly giant, whose conveyance carries passengers from Prescott to the Howell reduction works, on Lynx creek, and vice versa, made the round trip yesterday and brought the best news of the season, which is that two of Hesser's six-mule teams started yesterday morning for the Atlantic and Pacific railroad, with between 12,000 and 15,000 lbs of silver bullion. Other teams, hauling the precious stuff, will start to-day, and similar shipments will follow. The company will pay its small army of workmen to-day.

CAVE CREEK.—*Arizona Gazette, May 10:* Mr. Dan White returned from Cave creek yesterday, and from him we glean the following items: Wm. Everson has struck a very rich streak of gold-bearing ore in his mine, and will have some worked soon. A clean-up from five tons of ore, worked in an arastra, from the McShackerty mine yielded \$60 in gold, or at the rate of \$12 per ton. The ore was taken from the entire width of the ledge, which is about 80 ft, without assorting, and the yield is satisfactory. The Golden Elcece mine, owned by Mr. Mack, is showing up well, and will prove a good piece of property. The Queen Sabie mine, owned by Messrs. Polhemus and Goodfellow, also shows well in free gold and permanency of ledge matter. Work on the Phoenix mine has been suspended for a time, the tools, furniture, etc., having been removed to the Golden Elcece.

COPPER.—*Mohave County Miner, May 6:* Until within the past few months but little attention has been paid to the numerous ledges of copper ore which abound in many parts of Mohave county, in fact so much has been written about our gold, silver and galena ledges that our copper deposits have been almost lost sight of. This has been owing principally to the fact that there have been no facilities for working copper ores in this county, and that the rates of freight have been too high to allow of their shipment elsewhere. The Atlantic & Pacific railroad, however, has changed all this, and mining men and prospectors are now turning their attention to our copper ledges as well as the other more valuable ones—more precious, but not less useful. Copper ledges abound more or less all over Mohave county, though little or no work has been done on any of them heretofore, except on Grand Gulch and Adams' claims, which lie in the extreme northwestern portion of the county, near the Utah line. The Grand Gulch M. Co. has erected large smelting works near the mine, which have been in successful operation for the past two or three years, but Mohave county has experienced little or no benefit from them, the mines and smelter being owned by citizens of Utah, and all of the bullion produced being shipped to Salt Lake. It is now proposed to move these works from their present location to the banks of the Colorado, at a point near Pierce's ferry where wood and water are abundant. The mines of Gold Basin and Lost Basin districts, on the opposite side of the river, furnishing the necessary fluxes in unlimited quantities. If this proposition is carried out it will be a great help to Mohave county, and more especially to the miners of Gold Basin and Lost Basin. In the southwestern portion of the county, on the western slope of the Wallapai range of mountains, are found some immense deposits of copper ore, of which we will endeavor to give a correct and exact description, though they should be seen to be properly estimated. The mines are situated near the western boundary of the Cedar Valley district, about 15 miles from Cedar and some 35 miles south of Kingman. The Atlantic & Pacific railroad passes within 14 miles of the largest of these claims. The copper mines of Mohave county are destined to take a prominent place among its many other rich mines,

and it will not be many months before old Mohave will be producing an output of copper bullion that will astonish everyone and make some of the copper companies in the southern portion of the Territory take a back seat.

WATER.—*Pinal Drill, May 10:* At the Queen Creek smelter, the tunnel from the bottom of the well has reached across the creek. An incline shaft will be sunk to reach the tunnel at the end thereof, which will intercept all the flow of water in the creek and give a plentiful supply for all purposes. This work will be finished within another week. They have struck water.

SILVER KING. Work at the Silver King consists in the sinking of the various shafts, with better results as they descend. In the Silver King mine itself they are sinking the working shaft deeper, and the ore is fully as rich as above.

COLORADO.

YORK GULCH.—*Register-Call, May 12:* A reporter of the *Register-Call*, yesterday, visited York Gulch and Vermillion mining districts. He found a large number of prospectors at work on different locations recently made. The most promising of these were the Barnacle and London, which have attracted a great deal of attention, and, through their discovery, have led to the discovery of other veins. Smock & Co. have a lease on the London, but, owing to heavy seepage of water, are not working below a depth of 40 ft. Development work is confined to drifting north and south. At the Barnacle, north of the London and on the same vein, a new pit has been started, in which, from the grass roots down to a depth of only two feet, mineral has been found. The water in the London is being kept under control by means of a "whip." In a conversation with Mr. Owens, the fact was elicited that the average of the ore sold from the Barnacle—ten tons—has netted an average of \$100 per ton; that the time devoted to its development—two men working—has paid them \$12 per day. A. E. Graham, Mark C. Christenson and Christian C. Johnson have made a location called the Denmark, southwest of the Barnacle. They have a pit down to a depth of 10 ft, and are tracing up the vein on the northeast, which they claim will cross or intersect the Barnacle. The service matter is decomposed, but as yet no mineral has been taken out.

KEYSTONE LODGE.—This promising true-fissure vein, situated in Quartz Valley mining district, is beginning to show up more splendidly than ever before. It is now opened up for a distance of over 400 ft in length. The main shaft is down to a depth of 110 ft, with a California whim, blacksmith shop and other surface improvements that are needed to continue deeper workings at that point along the line of the vein. East of the whim shaft is another shaft 80 ft deep. Both shafts are connected by a drift. A recent visit to the property convinces the reporter that an ore body—left in reserve—could be made to produce fully \$9,000. It is a characteristic of the vein that where it widens out the best pay is found—the mill dirt running six ounces gold per cord. The average of the ore, so far as the reporter has been able to obtain, has been four ounces gold per cord. The average width of the pay matter is fully four feet. The mill gold commands, at the banks of the city, \$15 per ounce.

IDAHO.

ANOTHER BONANZA.—*Ketchum Keystone, May 4:* Recent developments in the Junction prospect disclose a remarkable ore vein of 18 to 22 inches of solid galena and carbonates. The ledge is firm, uncovered 30 ft, and traced 800 ft. It is tapped by a tunnel starting but a few feet from the main road. The grade of ore is good, and the owners intend to put on a large force just as soon as the roads will admit of ore hauling. Want of space forbids further mention in this issue.

KETCHUM A SMELTING CENTER.—The Philadelphia Mining & Smelting Co. will immediately plant two additional smelters of 50 tons capacity each, to be constructed after the pattern of the famous Grant works at Denver. Contracts are made for all the necessary building materials, and the machinery is en route. The new plants will be finished and ready for operation within six weeks from date. They are to be placed about 100 ft from the original plants, and connected with the same by a shed. It is the purpose of this great enterprise to control the entire Wood River country and furnish a profitable market to the whole mineral region surrounding, in Idaho and adjoining Territories, and to be prepared at any time for the reduction of all smelting ores from any region, even at the necessity of new and additional plants. The said company will aim to concentrate their smelting facilities at this point, refusing no smelting ores and paying for the same the best possible cash price obtainable anywhere. Ketchum is destined to become, in the near future, a great smelting center. They will compete with the world, and, having plenty of capital and better facilities, will leave little room for the various one-horse stacks about the country. A capacity of 180 tons daily is certainly a test for the mineral wealth of Wood River. The adoption of Omaha prices, cash, less transportation, leaves no possible reason for a continuation of shipment, and the mines of Vienna, Sawtooth, Galena, Boulder, Lake creek, Ketchum, Warm Spring creek, Bullion and Bellevue will find their only profitable market at this place. As fast as the entire Wood River and surrounding country can turn out ore it can be sold for the highest cash price, and turned into bullion at the Philadelphia Co.'s works at Ketchum; and this settles the problem of finding a profitable market. Thus the only thing remaining is to extract the ore. The new smelting works will be fitted out in the latest and most approved style with every advantageous modern improvement, such as electric lights, etc.

THE GRANITE FORMATION.—*Wood River Times, May 10:* To the west of the limestone formation, on Deer creek, are located the Washington, Snowfly and Davitt mines upon one continuous vein, in a decomposed granite formation. The development work on the Davitt mine, so far, has opened up richer and larger bodies of ore as depth is obtained. The Star mine, which is a good property so far as explored, is in the same formation. The Parrell mine is another instance, located upon Deer creek. The majority of the developed properties are in white and blue lime.

THE NARROW GAUGES.—The Narrow Gauge mines are employing more men daily, and, with the Bannock, form a lively camp. A strike of fine ore in

the Narrow Gauge No. 1 was made last week and not reported. This location is in contact formation between granite and lime, and is regarded as a valuable property.

MONTANA.

MOUTON.—*Inter Mountain, May 9:* Everything is running smoothly at the Moulton, and the ore bodies continue to show no signs of exhaustion. On the 300 level the appearance of the south vein is very promising, and ten tons of high grade rock is extracted daily.

The working force of the Clear Grit has been reduced until the decision of the company with reference to the erection of a smelter to treat its product shall be made known. Mr. Kessler says that the mine in its present condition is fully capable of supplying a 50 ton smelter.

NEW MEXICO.

NIJES.—*Lake Valley Herald, May 10:* The Ore de Mesa, at the north end of the Magdalena, is raising free gold. Pat Leary has made a discovery of excellent mineral in the White mountains. It is reported that rich placer claims have been found in Los Cerrillos district, Santa Fe county. Peroxide of manganese in large bodies appears in the nameless mine at the head of Water canyon. The large ore dump of the Boston mine, at Pinal, is being carefully assorted preparatory to smelting. An important discovery of free flowing oil in Valencia county, by Albuquerque miners, has been confirmed. Rusty gold has made its appearance in the Cabinet mine of the Galinas, and by Prof. Simmon's assay yields a total value of \$666.75. An important strike of gold ore has been made 13 miles southeast of Santa Fe and four miles northwest of Gloria, as saying \$500 per ton. Col. Stapleton has discovered and located a body of excellent bituminous coal on Jaralosa creek. The coal lies in two veins, one five feet and the other two feet in width, divided by shale. Hardee & Hurlburt have sufficiently developed the Surprise mine, in the Bald mountain district to assure its sterling value. Last week ore taken from the bottom of the shaft assayed 692 ounces of silver, or \$788. This mine is in the same mineral belt in which all the recent rich properties were discovered. A large body of silver has been struck in the Silver King Mine, at Bullard's Peak. The character of the ore is similar to that of the Black Hawk mine, and reported equally as rich. The property is owned by Messrs. Bradley and Henderson, who have done a large amount of development work upon it. The strike was made at a depth of ninety feet. W. S. Ross, one of the old pioneers, has "hooked on" at last. Mr. Ross informs us that he has struck a vein of free gold bearing quartz, four and a half feet in width, at a depth of ten feet. It is no secret that the Jicarilla placer fields are as rich as any discovered. Where there are such immense deposits of gold in the gulches there must be some very rich leads. The Reserve, near Socorro, is worked by a well constructed double compartment shaft. No. 1 is down 230 feet; No. 2 has reached 125 feet, from the bottom of which a level runs west with a view of intersecting the main lead of the claim, and when that is reached it will be in solid formation. No stopping has yet been attempted. The dump of No. 2 displays a quantity of rich chloride ore.

UTAH.

BEAVER COUNTY MINES.—*Salt Lake Tribune, May 11:* Beaver county has a brilliant prospect of future greatness. The Horn Silver is sending out its steady stream of bullion, so is the Carbonate, Cave and some other mines, while the developments going on give promise of big things from several districts. From parties from Frisco we learn that there was a succession of strikes which have made but little noise, and yet are important events. The Piencho range, lying southwest of Milford, is about nine miles in length, and the greatest width three miles. On this range a few persons have been delving for the past 10 or 11 years, working under many disadvantages, and yet always with a hope that their day of prosperity would come with such abundance as to fully repay for all their toils and capital. Taking the range, and there have been strikes in the Magnolia, Creedmoor, Samaria, Mammoth, Talisman, Stalwart and several minor claims which lie with the trend of the range and extend nearly its entire length. The Samaria has several thousand tons of ore in sight, according to reports. The Talisman has 100-ounce ore in a 50-ft shaft, which struck the ledge 200 ft below the croppings on its dip. The Mammoth has a 700-ft tunnel with an equal amount of drifts, and has a large body of ore, lately struck. The strike is at a depth of 400 ft on the ledge, the ore being carbonate—50 or 60 ounces silver to the ton, and 55% lead. Cullen & Ryan, the owners, are preparing to ship extensively. The Stewart, owned by P. H. Martin and brother, is looking very fine, and has very rich ore. They are down about 200 ft and, with depth, the ore grows richer. This locality, known as the Star district, is all within from 5 to 15 miles of Milford, and hence is easy of access. In this connection it is well to give the products of Beaver county in the past, up to January 1, 1883: Horn Silver bullion, February 17, 1879, to January 1, 1883, \$6,938,698.73; Frisco M. & S. Co., January 1, 1881, to January 1, 1883, \$900,000; Shantice Smelter, 1873 to 1877, \$1,000,000; Troy, Riverside, Mountain Queen, etc., \$500,000; total, \$9,438,698.73. The Horn Silver has produced this year, to May 3d, \$1,210,600, and Frisco M. & S. Co. has been turning out a regular stream, so that the county has produced nearly or quite \$12,000,000 in precious metals. The Cactus property, near Frisco, is getting in shape with its concentrators to soon make itself known as a large producer, while other claims in that locality are being developed to good properties. The Cave mine sends out its steady stream of ore for reduction at the Frisco smelter, and in this district, lying east of Milford and extending over towards Beaver, there are being developed several good properties. The outlook of Beaver county is certainly bright.

REVIEW.—*Salt Lake Tribune, May 12:* The receipts of ore in this city for the week ending May 10th inclusive, were \$132,451.12, against \$173,724.51 the week previous, and \$118,371.82 the week before that. The shipments for the week ending May 5th, inclusive, were 68 cars bullion, 1,635,777 lbs; 5 cars copper matte, 148,410 lbs. Total, 73 cars—1,784,187 lbs. The Horn Silver shipments for the week were nineteen cars, \$57,000 of bullion; previously reported during the present year, \$1,210,500; present aggregate, \$1,267,500. The quarterly dividend, of \$300,000, which has been so regular under the present management, is officially announced for May 15.

Oregon Notes.

EDITORS PRESS:—While Portland to a person coming from San Francisco seems a dull and unimportant sort of place, it is, nevertheless, a very active and rapidly growing town, sharing largely in the generally prosperous condition of the State, business throughout Oregon having been unusually good the present year. This whole northwest country, Oregon, Washington Territory and British Columbia included, has, in fact, been well prospered of late, a condition of things due to a variety of causes. In the first place, the wheat crop of Oregon, its staple product, has been large, and is being disposed of at remunerative prices. The hop crop, too, both of this State and Washington Territory, has yielded abundantly, and was gathered in fine condition and found ready sale at prices more than double ever before realized by growers here. The lumber business, not only in Oregon and about Puget Sound, but even in some parts of British Columbia, has been lively and paid well. The mines, wherever worked, have produced a full average of bullion, while the great activity in railroad building has imparted additional life to all other industries, this last being the principal factor in bringing about so much improvement in the business of this entire northwest country.

Railroad Building and its Effects.

There are now approaching this region two trans-continental railroads, the Canada Pacific to terminate in British Columbia, and the Northern Pacific with branches terminating in Oregon and Washington Territory. Then, there is what is known as the Oregon Short Line, which, starting from Granger, a station on the Union Pacific road in Wyoming Territory, strikes northwest across Idaho, and, entering eastern Oregon, connects with the general railroad system of the State at Baker city. In addition to this, we have various local roads, some of them branches of the main overland lines, and upon all of which work is either now in progress, or will shortly be commenced. Among these local roads projected or being built, is one from this city to Astoria, also one leading east up the valley of the Columbia river, one from the coast up the valley of Rogue river, one leading into Grand Ronde valley. A narrow gauge track is being laid down to connect the town of Reno, on the Central Pacific, with southeastern Oregon, a part of this road being finished and in operation. The gap on the California & Oregon railroad is being closed.

When Oregon comes to be placed in direct railroad communication with the Atlantic seaboard it is expected that immigration will be greatly increased, the facilities for reaching the State from that quarter having heretofore been very imperfect. The prospect of this being accomplished so soon has already caused much government land to be taken up and considerably enhanced the value of both farming lands and town property in many parts of the State. In some farming districts the value of land has, through the building of railroads into or near them, been advanced from twenty to fifty per cent, the inhabitants being able now to dispose of their produce at a profit, which before they could not do, even wheat failing to bear cost of transportation to market. The railroads, employing so many men in their construction, have also created a local demand for the products of the farm as well as for fresh meats of all kinds, thereby affording the husbandman and stock-raiser a good home market, where before they had none or only a very insufficient one.

Every town along and adjacent to these new railroads is a very hive of industry, swarming with workmen, and teeming with busy life of every kind. East Portland is one great workshop, in which railroad machinery of many kinds is being turned out and thousands of freight cars being built in anticipation of the wants of the various companies.

As Compared With California.

Oregon seems to possess some advantages and some disadvantages, the natural features and conditions of the two countries being in many respects alike. Large sections of both are covered by rugged mountains, treeless sage lands and arid deserts. The mountains of Oregon are little worth except for their timber, they being for the most part well wooded. The sage lands, located mostly in the eastern and southeastern parts of the State, contain a great deal of bunch grass, affording a large amount of pasturage. The soil is generally good, and with irrigation produces fair crops of grain. The facilities found here for irrigation are, however, very limited, water being a rather scarce commodity. The deserts, occupying also the southeastern part of the State, except the little grazing afforded by their scanty growth of bunch grass, are nearly worthless. Southeastern Oregon and northwestern California are much alike, nearly the whole region being either hilly or mountainous, and well watered and timbered. The soil is everywhere good, but owing to the density of the forests in some places and the generally rough and broken surface of the country, it is not of much value for either farming or grazing purposes, though

there are some valleys and river bottoms where both these pursuits can be carried on to advantage, the whole district being well suited to fruit growing. On the California side of this belt much placer mining is being carried on, with a little also over the line in Oregon. About Coos Bay, a little north of the California line, extensive coal mines have been opened, and are now being worked.

Meteorological Conditions.

In the valleys and on the open uplands, which in both States, constitute the principal grain growing districts, the soil and climate are much alike, the most notable difference being that the climate of this State is more moist than that of California, the average annual rainfall here amounting to forty-six inches against only about half that quantity in San Francisco, where the rainfall fairly represents that of central California. Not only is the amount of precipitation here greater but it is distributed over a longer period than with you, we having only three, whereas, you have six nearly rainless months in the year. But little rain falls in California after the first of April and hardly enough to set the plows going before the middle of November. We usually have from two to three inches of rain in both April and May with nearly half as much in June and July, August being here the only absolutely or nearly dry month in the year. February is apt to be our wettest month and not December, as in California. In September we usually get from three to three and a half inches of rain with about the same quantity in October, followed by five to six inches in November, December and January, each. February almost always brings from twelve to fourteen inches and March about one half as much. Besides so much more rain, we have a greater number of cloudy days with more damp and misty weather generally than is experienced in

service than the Goodall & Perkins line have secured to these two cities. Against this company no word of complaint has ever been heard from either the commercial or traveling public, a fact that speaks volumes in their praise.

Portland, Oregon. H. D.

Pitch in.

We don't like to say anything reflecting even remotely on our old time miners—they are as good hearted a set of men as the sun ever shone on—but some of them are not sufficiently wide awake for their own interest. Here, in this country, are hundreds on hundreds of gold and mineral bearing quartz ledges, and nearly every old miner in the different districts knows of some one or more ledges from which a good prospect can be obtained, and probably most of them have made "locations," staked off claims, and did a little work on croppings. Now, if sufficient "elbow grease" had been laid out on these ledges to make a good showing in the way of development, and the ledges presented a favorable appearance, as many of them undoubtedly would do, there would be no difficulty in the owners either obtaining means to continue their work or selling their claims for fair prices.

The old timers have the best show at present, by reason of familiarity with the country, and should go for everything they can in the mineral line, and go for it with vim. There are "dead loads" of gold in our ledges and hills, and there are men and capital coming after it. Let the pioneers secure themselves, or place themselves in positions to have a share of the future golden era. Let every one who has not done so pitch in, secure a quartz claim or an interest in one, and go to work to reveal its merits.

Old timers are too liable to sit down in the

Situation and Surroundings of Portland

We give on this page a handsome engraving showing Portland, Oregon, and some of the notable features of the country surrounding it. The growth and prospects are themes which the Oregonian never tires to talk about, and they are matters in which all who enjoy the growth and development of the Pacific coast will take an interest. Of late years, Oregon and Washington Territory have secured a large share of the immigration to this coast, and the settlement of the country and the increase of its productions has been notable. It cannot be doubted that progress in this direction has but just set in, and that the coming completion of through lines of transportation eastward will add a new impetus to all industries and swell the population of all well placed towns, while at the same time it will plant new towns and new country homes upon the vast and rich region which is still unoccupied.

Portland—in latitude 45° 30' north, longitude 122° 27' 30" west—is a port of entry, the county seat of Multnomah county, and the commercial metropolis of Oregon. It is pleasantly located on the west bank of the Willamette river, about thirteen miles above the junction of the Columbia, and about 110 miles—by the river course—from the Pacific ocean. The city is located on a plateau, which gradually increases in height as it recedes from the river, until it forms a range of hills at the western extremity of the city, from which may be seen the snow-capped summits of Mounts Hood, St. Helena and Jefferson, the Cascade range of mountains, and the meanderings of the Columbia and Willamette rivers.

Approaching Portland on board a steamer from San Francisco, at the present time, one's first impression of the place is usually of a decidedly unfavorable character, owing to the line of dingy looking docks that obstruct the view. However, on landing and passing from street to street, a city of peculiar beauty is opened to the view, and one is surprised at the massiveness of the buildings and general thrift displayed in all branches of business. However, one blot on the otherwise unsoiled picture consists in the narrowness of the streets, most of which are but sixty feet in width. This defect, however, is soon lost sight of as we move from place to place and see on all sides unmistakable signs of wealth and comfort.

From the summit of the hills above referred to a scene of simple grandeur is unfolded. Away to the north the whole face of the country is dark with timber, through which the silvery water of the Willamette is plainly visible until it empties into the great Columbia, twelve miles distant. From far up the Columbia, the bright water may be seen as it moves steadily onward to the sea, and it is only lost to sight in the dim distance far to the west. Slightly east of north, and beyond the Columbia, the quiet little village of Vancouver is plainly visible, while, overlooking the river to the east of it, may be seen the Government reserve, with its barracks and parade ground, while in the latter a tall mast supports the stars and stripes as they proudly wave in the free air of heaven. To the right of this, and far off in the north, the pure white summit of St. Helena may be seen reaching above the surrounding mountains, standing 9,570 feet above the level of the sea; behind it, Rainier shows its cap of perpetual snow looming up in the heavens for 14,444 feet. Two other snow-capped mountains are seen to the right, but to grand old Hood, "the pride of Oregon," is ascribed the honor of capping the climax, as it sits in its silent glory, 11,255 feet high, off in the mountains to the east, perfectly formed, symmetrical and beautiful.

The people of New Mexico and Arizona are organizing to protect themselves against the Apaches. It is the fashion to growl at the military, but it appears that the Department forbids them crossing the Mexican line, or that of the San Carlos reservation in pursuit of hostiles. This gives the savage adequate protection. They maraud in Mexico until they are chased out, when they run for the reservation, killing, scalping, and burning on the way. Once across the line, their war parties are fed and recruited at Government expense until they are ready to go back to Mexico, when the same thing is repeated. An organization of frontiersmen will not observe the sanctity of San Carlos, but will cross the line and catch the Apache with his gun unloaded, and the difficulty will be solved.—*Exchange*.

MINING, to result successfully, admits of no neglect and must be watched attentively. Confidence and good staying qualities go far to make the successful mining man. Never give up while hope remains, for another foot further may bring the desired object. Never be carried away with the idea that heavy ore bodies must be the immediate result, or disappointment will follow. The cool, calculating, careful, energetic miner is the one who always wins. Good, honest mining ability, well encouraged, never yet injured a mine or harmed a district. About one dozen such men are needed in Aurora.—*Esmeralda Herald*.



PORTLAND, WILLAMETTE RIVER, AND MOUNT HOOD.

California, the excessive moisture of the climate having gained for the inhabitants of Oregon the absurd name of "Webteet."

The foregoing remarks apply only to Northern and Western Oregon, the annual rainfall here, as in California, increasing as we go north, and diminishing as we go south and east. Thus, it amounts at Roseburg, in the southern part of the State, to only thirty-six inches, while the quantity that falls at Olympia, seventy miles north of this place, amounts to sixty-three inches. Then, too, the country lying east of the Cascade mountains has a climate very unlike that of Western Oregon, the former having much less rain, but more snow, with colder winters, the climate being in most respects similar to that of Nevada, and other countries lying east of the Sierra Nevada. Eastern Oregon is an elevated, mountainous region, the various ranges being separated by fertile valleys or broad sage plains, the latter affording much good pasturage, but being, as a general thing, deficient in water and timber. In some of the mountains in this section of the State, gold mining, principally placer, is successfully and extensively carried on.

Notwithstanding its somewhat moist climate, Oregon is an exceedingly healthful State, quite as much so as California, which, of course, is saying a good deal in favor of her sanitary conditions. We have here very little rheumatism, consumption or other pulmonary complaints, while anything like endemic diseases is hardly known. Malarious fevers, so common in the Western States and along some of the river bottoms of California, occur here in but few localities, and always in very mild form. According to the mortality statistics of the U. S. Census, Oregon shows a lower death rate than any other State or Territory, save only Idaho.

What has tended to check the growth of Oregon, with her abundance of cheap land, fine climate and other natural advantages, has been her remoteness from the great supplying centers of population and her comparative isolation, she, having been until lately without a single railroad connecting her with countries outside her own borders. The steamships plying between this port and San Francisco have it is true, in good part made up for this deficiency, no communities having ever enjoyed a better

neighborhood of a good thing and never find it. New comers keep their eyes open and hunt for gold, and generally find it by industriously seeking it. George Klein went over to Deadwood, hunted for and found the continuation of the rich French Gulch leads, right where many other men had passed but failed to search; Shafter dropped on the famous claim above the Tower House, and is making a fortune; Banghart went up to Whiskytown and went to work and found the famous Mad Mule seam diggings and a fortune; Zent came from Oakland, and he and his partner went to work at Whiskytown and struck a \$2,000 pocket in less than no time; Lowry came up here after an absence of twenty odd years, and he and Brinard took their picks, shovels and pan, and after a few days persistent work struck the Middle Town pocket which shelled out \$10,000 or so, in a couple of weeks; Welsh and his partner got tired of not making much money at Redding and set to work at the head of Obey Creek and discovered a decomposed ledge from which they have taken more money than they ever expected to have when they started for California. And we might go on with this enumeration, but have said enough to remind all that we have the gold in our county, and that those who hunt for it are likely to find it.—*Shasta Courier*.

A LUCKY CAVE.—Last week a cave occurred at the mouth of Hamilton McCormick's tunnel, through which he was working a quartz ledge. There was so much debris he concluded it would be a great deal cheaper to hydraulic it, and prepared a sluice to wash the dirt, thinking he might get enough gold out of it to pay for the expense. When he cleaned up the gold he was surprised to find a very large number of nuggets varying in size from four bits to several dollars, and the nuggets alone yielded him about five hundred dollars, besides fine gold reaching over that amount. Mr. McCormick thought he might clean up a little gold, but had not the remotest idea of getting a thousand dollars from the debris. He says he had never seen any nuggets in the immediate vicinity of his place before, where he had been mining for many years.—*Transcript*.

THE ENGINEER.

The Canal Age.

Appropos of the movement at present in progress for the construction of the ship canal between Liverpool and Manchester, a writer in an ably-conducted North of England paper very pointedly draws attention to the probability of the remaining years of the nineteenth century being spoken of in history as "The Canal Age," his opinion being that the present indications are in the line of a large extension inland water carriage by means of canals, and that the problem of quick international communication has now been solved, almost to "finality," by steamships and railways. Whether or not finality has been reached by these two great civilizing agencies, it is undoubtedly the case that the prospects of canalization on a great scale for the immediate future bulk very largely in the eyes, both of commercial men and of engineers. Not only is there in hand the project of the Liverpool and Manchester Ship Canal, with its probable cost of \$30,000,000, estimated to make an income enough to pay the shareholders if only a single ship of 4,000 tons pass both ways every day, but there are also various other great inland waterway schemes, of national and international importance, either in hand or actually carried into execution.

The sum of \$200,000,000 has recently been voted by the French Parliament for inland canalization works, and it is thought that at least five times that sum will have been spent upon such works before the system of inland water carriage in France has been completed.

Many of our readers are familiar with the great engineering works which have resulted in the completion of a ship canal connecting the city of Amsterdam with the sea, and they scarcely require to be informed that it has proved to be a remarkable success, commercially and otherwise.

Additional canals are likewise in course of construction or projected in Belgium, a country well adapted by nature for such works.

Then, going into Prussia, we find that there is a prospect of a speedy beginning with the canal scheme which aims at connecting the Rhine, the Weser and the Elbe with the Baltic sea, at an estimated cost of upward of \$35,000,000. Proceeding further east, we should notice another proposal which bids fair to become an accomplished fact in the early future, which is a scheme to cut a ship canal to connect the river Danube with the Oder, and thereby joining the Black sea with the Baltic.

But in Russia it is proposed to enter upon even a much larger canal scheme, to wit: one to connect the river Dnieper with the Vistula, and thereby to bring the great ports of Odessa and Dantzic into direct communication.

A cable dispatch of May 10th says: A meeting of influential shipowners, to-day, in London, including representatives of 3,000,000 tons of Suez canal traffic, unanimously adopted a resolution favoring the construction of another canal across the isthmus, and appointed an executive committee to carry out the plans of the meeting. More or less similar schemes are likewise contemplated in other parts of the world—in Canada, Southern Europe, Southern Asia, the U. S., etc.

In our own country, the Florida canal may now be considered a definite fact. An organization was effected in Washington on the 9th instant, by the election of ex-Governor John C. Brown, of Tennessee, as President, with a large number of wealthy and influential corporators. Gov. Butler, of Massachusetts, among them. It was estimated that the canal will cost \$30,000,000, of which \$26,000,000 was reported as subscribed. The canal will be about 100 miles in length, and broad and deep enough for the largest class of ocean steamers. Its connection on the gulf side will be through the mouth of the Suwanee river, now so famous in song. It will connect with the St. John's river about twenty miles above its mouth.

WILL THE MISSISSIPPI CHANGE ITS MOUTH? The drawing off of a considerable volume of water from the Mississippi by the Atchafalaya river has created some alarm at New Orleans and neighboring towns on the great river. At the present time the Atchafalaya river is drawing away from the Mississippi a volume of water estimated at 300,000 cubic feet per second, or about one-fifth of the latter's entire volume, and is pouring it into the Gulf by a route only one-third as long as that pursued by the Mississippi, and having besides a much greater fall toward the sea level. The result of all this is that the Atchafalaya river is steadily increasing its volume to the detriment of the Mississippi; and if the outlet to the former is not stopped up, or prevented from increasing in size, New Orleans will, in time, be without a river, and all of the money expended upon the jetties will have been expended to no purpose. It is predicted by a prominent U. S. Engineer, that the Mississippi will cut its way into the Atchafalaya bayou, within a year or two, and make that the main channel from the mouth of the Red river to the Gulf. Should that occur, it would shorten the line to the Gulf about 200 miles, but as the cities along the present course and Capt. Eads will decidedly object to the change, it is likely that such steps as we suggested last season will be adopted to prevent the change, and at the same time allow of the overflow, in very high water from the Mississippi, through Atchafalaya bayou to the Gulf and thus save the country below the mouth of the Red river.

USEFUL INFORMATION.

Improved Leather for Pump Valves.

Almost every one who has had anything to do with leather valves, whether in connection with blowing engines or other machinery, says the *Iron Age* knows the difficulties attendant upon the use of ordinary leather for the purpose. Various substitutes for leather have been tried, among which may be mentioned rubber in various shapes, but serious objections to all have been evident, even on slight trial, and the demand for a really good article for this purpose is widespread. The Shultz Belting Co., of St. Louis, recently introduced a peculiarly prepared article of leather for this use, which, says the *Age*, by its characteristics possesses many advantages for such uses. In positions where ordinary leather has in a few days broken off by the hinge-like motion to which valves are subjected, valves made of fulled leather have proven very durable. A peculiarity is that the material thus produced becomes softer the more it is bent and worked. The Cambria Iron Co., placed valves made of this material in the most severe parts of their engine, and up to a very short time since they were still in use and were working satisfactorily. The statement is made by the general manager of the company that valves made of ordinary leather in the same position only last a few days. From the fact that valves made of this material, whenever introduced, have given very great satisfaction, it would seem that the employment of leather of this kind, for the purpose, was a matter in which iron manufacturers generally are interested.

RELATIVE COSTS OF STREET LIGHTING BY ELECTRICITY AND GAS IN NEW YORK.—New contracts for lighting the streets of the great city of New York have just been awarded, to begin May 1st. The price to be paid for gas lighting for the closely inhabited part of the city, in which by far the larger portion of the lamps are located, is \$17.50 per year per light. In the outskirts and sparsely inhabited regions, from \$19.50 to \$32.00 per gas light is to be paid. The use of electric lights will be continued in portions of Broadway, Fifth Ave., including certain parks and squares, in all, a length of about six miles, at seventy cents per night per light. Arc lights are used of the Brush Company, also of the United States Company's styles. Each electric light displaces six gas lights. The contract price for each electric light amounts to \$225 per year per light, which is rather more than double the cost of gas in the chief parts of the city. It is conceded, however, that the quantity of light furnished by an electric light is much greater and better than that yielded by the six displaced and dingy gas lamps. The streets that are illuminated by the electric lamp present an attractive and brilliant appearance. Reckoned by quantity of light supplied, the arc lamps are far cheaper than gas. Not so, however, with the incandescent system—the Edison system, for example, which is not at present used for street lighting in New York. Each small Edison light, not quite equal in force to an ordinary gas light, costs rather more than gas.

PREPARING FOR ACCIDENTS.—The passenger engineers on the New York, Lake Erie and Western Railroad are being furnished with a small box of appliances to be used in case of accidents. They are requested to carefully read the instructions which accompany the box, in reference to the proper treatment of injured persons, to have their firemen do the same, and to keep the box constantly on the engine, where it can be obtained at a moment's warning. The box contains broad and narrow bandages, with safety-pins to fasten them, a compress of dressing cotton covered with cotton gauze, hemostatic cotton to stop bleeding, surgeons' plaster for use in bruised wounds to draw parts together and permit healing by first intentions, a bottle of soothing ointment for cuts, burns, scalds, etc., and a bottle of tincture of arnica. The little pamphlet which accompanies the box gives minute descriptions how to bandage any part of the body, and illustrates the same by a number of cuts.

A COLONIAL EXHIBIT.—A prominent and interesting feature in the approaching Amsterdam Exhibition will be the Colonial Section, in which will be shown specimens of the production and resources of the entire colonial world. It will comprise examples of everything interesting in the natural history of the different colonies. A second category will comprehend a complete collection of objects illustrative of the civilization of the tribes and people indigenous to the several colonies, their manners, customs, domestic economy, arms, dress, etc. A third group will consist of everything of use or interest in colonial enterprise—the appliances of travel or exploration, the military equipments, manufactures, coinage, etc., of the European settlers.

BRASS WORK that is so dirty by smoke and heat as not to be cleaned with oxalic acid should be thoroughly washed or scrubbed with soda, or potash water, or lye. Then dip in a mixture of equal parts of nitric acid, sulphuric acid, and water; or, if it cannot be conveniently dipped, make a swab of a small piece of woolen cloth upon the end of a stick and rub the solution over the dirty or smoky parts; leave the acid on for a minute and then wash clean and polish.

CAUSE OF DARKENING IN BRONZE WORK.—The Society of Architects, of Berlin, have been investigating the subject of the change of some kinds of bronze to a black hue. It appears that one of the most notable statues in that city had become covered with a darkish layer, while an old cannon before the arsenal had retained its fine green color, the two having been exposed to the same atmospheric action. Upon being analyzed, the bronze of the cannon was found to consist of nine parts copper and one part tin; the bronze of the statue, however, exhibited a good percentage of zinc, and to zinc the change of color is regarded as due. In order to ascertain the facts in the case definitely, several copper alloys were subjected to the action of a copper solution. The result was that the alloys of tin and copper alone took the green color, while the alloys containing zinc became more or less black, according to the quantity of zinc they contained.

A SO-CALLED "ELECTRIC FLANNEL" has been invented in France by Dr. Claudat, who affirms that it is efficacious against rheumatism. This flannel contains, per kilogram of wool, 115 grams of oxides of tin, copper, zinc, and iron. A series of threads of the tissue saturated with these metallic products are woven alternately with the ordinary threads. The flannel so prepared forms a dry pile. M. Drincourt, professor of physics at the Rheims Lyceum, and M. Portevin, of the polytechnic school, have proved, independently, by very precise experiments, that Dr. Claudat's flannel liberates electricity, either by simple contact, or better, in contact with the products of transpiration when the tissue is applied to the body.

HEMLOCK BARK EXTRACT.—There are produced annually in North America 100,000 barrels of hemlock bark extract, of which a single Boston firm produces 72,000 barrels. They own nine extract works, and operate 23 tanneries. All the tanneries of the United States consume annually 1,250,000 cords of hemlock bark, produced in nine States. As the yield of bark is about seven cords to the acre of hemlock timber, the yearly consumption implies the clearing of 178,000 acres.

A RIVAL FOR KRUPP.—Judging from recent accounts, there is now growing up on the banks of the river Tyne, in England, an establishment which, it is stated, promises to bear comparison with Krupp's enormous works at Essen, Germany, in addition to a shipbuilding yard capable of turning out vessels of war of the largest size.

GOOD HEALTH.

Constipation.

Constipation is the beginning of many diseases. It is the most prevalent of all affections among those not accustomed to out-door activities. It frequently commences in infancy through the neglect or ignorance of parents; and the health sometimes becomes permanently impaired, before the cause is discovered by the physician.

There should be at least one free and natural movement of the bowels every day, and when that is not the case, all proper means should be promptly employed to bring it about. Nature intends that the waste material, after digestion is completed, shall be passed out of the system within a certain time, but if that time is exceeded it commences to be absorbed, thus the blood is poisoned and the vital force is impaired; hence the body becomes an easy prey to disease.

Dyspepsia is generally the first diseased condition caused by constipation. The liver soon becomes involved as a result of indigestion, then the kidneys. It is evident that a long continued derangement of either of these important organs must result most unfortunately. All experience proves that habitual constipation is a very unsafe condition of the system, and one liable at any time to develop incurable diseases.

Various plans have been devised for the cure of this distressing complaint; but we do not believe in restricting the treatment to any one remedy. To secure success, various methods must be employed, and employed persistently. Some will after a while lose their effect, and others must be substituted; no quarter should be shown until this great enemy to health is overcome. The habit of taking purgative medicines to relieve the bowels often increases the trouble; that is, the system becomes accustomed to this remedy and there is no relief without it; the remedy debilitates, and it becomes only a question of time how long the treatment can be borne.

As in these cases there is always a torpid liver, we should commence the treatment with a mild cathartic—as two or three liver pills; and then pay especial attention to the diet. Bread made from crushed wheat or oat meal should be used; we should not restrict the patient as to other foods, except as to quantity. He should eat enough, but not overload the stomach. A tumbler of cold water with a teaspoonful of table salt dissolved in it and drank every morning half an hour before breakfast, often acts like magic in restoring the bowels to their natural condition. There are many cases of obstinate constipation, where the whole trouble exists in the lower part of the rectum, by impacting of fecal matter, due to feeble action of the muscles, and to a congested and dry condition of the mucous membrane at that point.

Regular and vigorous out-door exercise is all

important. Kneading the bowels with the hands has been recommended; also, the drinking of water frequently, to which we should always add a little table salt.

The frequent use of a syringe should be avoided, for much the same reason that cathartics ought to be avoided. No harsh or very active treatment is required in these cases; but mild remedies may be employed persistently; in fact, they should never be resorted to until the bowels become regular and the health is restored. We believe that a majority of cases are curable. We know of one case of great severity that lasted twenty-two years, and was then cured, although the general health has never been fully restored. *Hall's Journal of Health*.

THE HYGIENE OF SHOES.—That the shoes we wear are seldom made of the proper shape has been often pointed out by scientific writers; but the habit and fashion are not easily changed. The poor suffer more from this cause than the well-to-do; for cheap shoes are generally worse in pattern than more costly ones, and being clumsier and more flexible, cause greater distortion to the feet. Deformities of the feet and toes are especially frequent among the poor. This matter was the subject of an able and interesting paper, read by Col. Ziegler, Chief Surgeon of the Swiss army, at the Geneva Hygienic Congress. He stated that every year 800 recruits are rejected for malformation of the feet, resulting from badly-fitting shoes. The foot is in reality a bow, so elastic that at every step it contracts and expands, lengthens and shortens, and a line drawn through the center of the great toe intersects the heel. Shoe-makers do not give room enough for the lateral extension of the great toe, confining it until it is forced against the other toes, giving rise to inflammation, corns, ulcerations, and sometimes true articular inflammations. Another evil is flat-footedness, whereby the arch of the foot is converted into a straight line, and prolonged walking rendered impossible. Another cause of this defect is the carrying of heavy weights at an early age, but in most cases perfect shoes would restore the foot to its normal condition. A test of a perfect pair of shoes is that, when placed together, they should touch only at the toes and heels; the soles should follow the sinuosities of the feet, and, to give room for their expansion, should exceed them in length by fifteen or twenty millimeters. *Popular Science News*.

THE INCREASE OF INSANITY in the past few years, as shown by recent publications of the Census Bureau, appears to be very great. According to this statement the number of insane persons per thousand population in the United States has doubled in the past ten years. This statement is probably somewhat in excess of the real facts, as the inquiries in the last census were much more searching than on former occasions, but at best it seems that the percentage of insane persons in the population of this country must have increased very materially. It is a startling fact that out of our 50,000,000 of people, over one half million, or one per cent. of the population, are either insane, idiots, deaf mutes or blind, are suffering imprisonment for crimes committed, or are inmates of reformatories or poor houses.

SMOKING FOR HEALTH.—"Don't you know it's very wrong to smoke, my boy?" said an elderly looking lady in a railway waiting-room, to Young America, who persisted in puffing a cigarette, much to the old lady's discomfort.

"Oh, I smoke for my health," answered the boy, emitting a volume of smoke from his mouth, which almost strangled the old lady.

"But you never heard of a cure from smoking," continued the old lady when she had regained consciousness.

"Oh, yes, I did," persisted the boy, as he formed his mouth into a young Vesuvius; "that's the way they cure pigs."

"Smoke on, then," quickly replied the old lady; "there's some hope for you yet!"

THE *Lancet* says: "It is high time that attention was directed to the subject of narcotics generally, and the use of chloral and bromide of potassium in particular. Incalculable injury is being done, and public opinion is being grievously misled by the tolerance given to the use of 'sleeping drafts,' falsely so-called. In regard to this matter and that of the reckless use of hypodermic injections of morphia, the profession should seek to form a deliberate judgment, and gravely deliver itself. At the present moment we are under a heavy responsibility, which it is idle to deny and vain to disown."

WARM water, of all remedies, is the one of most general application. Cotton dipped in warm water makes the best and cleanest poultice that can be used. It is the most healing application for cuts, bruises, wounds, sores, felons and other inflammations. A very convenient way in case of felon or other painful abscess, is to hold the hand for hours in water as warm as can be comfortably borne. *Journal of Health*.

THE possibilities of electricity in medicine, according to a popular German physician and medical writer, seems to be almost without limit. The writer referred to, Dr. Suprunenko, reports quite a number of cases which have hitherto never been treated with electricity, but which in his recent practice have yielded to a moderately strong induction current.

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TABLE OF CONTENTS.

EDITORIALS.—Headwaters of the Arkansas; New
Dry Ore Separator, 337. Passing Events; Arbitration
in Mining Matters; Cupellation Loss in Silver Assay;
Working in Foul Air Underground, 344. English In-
vestments in Pacific Coast Mines; Timbering in Mines,
345. Patents and Inventions; Notices of Recent
Patents, 345.

ILLUSTRATIONS.—Fremont Pass, Headwaters of
the Arkansas, 337. View of Portland, Oregon, 342.
The Austrian System of Timbering, 25.

MECHANICAL PROGRESS.—Valuable Improve-
ment in the Manufacture of Refined Tool Steel; Steel vs.
Iron; In the New Alloy; American Locomotives and
Cars; Progress of Electrical Invention; Molding Pat-
terns; The Steam Engine; An Expert Workman; Trac-
tion Increases Tests, 339.

SCIENTIFIC PROGRESS.—Meteoric Iron; The
Artificial Aurora Borealis; An Internal Mite in Fowls;
Food for Thought; Thorium; Genesis of a New World;
On the Ammonia in the Air and in Rain, etc., at Great
Heights; Vibratory Movement of Bells, 339.

MINING STOCK MARKET.—Sales at the San
Francisco Stock Exchange; Notices of Meetings, Assess-
ments, Dividends and Bullion Shipments, 340.

MINING SUMMARY.—From the various counties of
California, Nevada, Arizona, Colorado, Idaho, Mont-
ana, New Mexico Oregon and Utah, 340-41.

THE ENGINEER.—The Canal Age; Will the Missis-
sippi Change its Mouth, 343.

USEFUL INFORMATION.—Improved Leather for
Pump Valves; Relative Costs of Street Lighting by
Electricity and Gas in New York; Preparing for Acci-
dents; A Colonial Exhibit; Cause of Darkening in
Bronze Work; A So-called "Electric Flannel;" Hem-
lock Bark Extract; A Rival for Krupp, 343.

GOOD HEALTH.—Constipation; The Hygiene of
Shoes; The Increase of Insanity; Smoking for Health,
343.

NEWS IN BRIEF.—On page 348 and other pages.

MISCELLANEOUS.—Inter-Oceanic Transit; Min-
ing Property; The Postal Changes; Recent Contributions
to the California State Mining Bureau, 338. Oregon
Notes; Pitch In; Situation and Surroundings of Port-
land, 342.

BUSINESS ANNOUNCEMENTS.

San Leandro Village Carts—Jacob Price, San Leandro.
St. Augustine College—J. H. D. Wingfield, Benicia, Cal.
The Home Seminary—Miss M. S. Castleman, San Jose.
Assessment Notice—Santon Gold Mining Co., S. F.
Meeting Notice—Gagnere Mining Company, S. F.

Passing Events.

The late rains have been good for farmer and
miner as well, and the water that has fallen is
being utilized, as far as possible. We note
elsewhere new tactics on the debris case by
which the attorney of mining companies is
served with injunction papers in default of the
proper officers being served.

From all points we hear of men going to work
for copper, and copper prospects are being de-
veloped rapidly everywhere. The experience
of a few mines has encouraged miners to look
for this metal, and it is gradually becoming
more important every year in the cost of pro-
ducts of this coast.

New smelters are being put up at Ketchum,
Idaho, and that point expects to be a smelting
center before long.

Work on the new borax deposits in San Ber-
nardino county is being prosecuted, and it seems
likely that a large borax field will be developed.

In Sierra county, several rich strikes are
noted, and a general revival of the quartz in-
dustry of Nevada county is going on. Men are
prospecting, and many new mines are being
opened. In Utah, the mining prospects are
very encouraging. From Lower California
comes news of new placer mines, but it is no
doubt in a dry region.

Arbitration in Mining Matters.

At the organization of a mining district in
Arizona the other day, a "committee of protec-
tion" was organized, to consist of eleven mem-
bers, whose duty it is to arbitrate any dispute
which may arise in the camp.

Now, this seems an exceedingly sensible
thing to do. Probably the miners themselves
are just as good judges of what is right and
proper as two or three courts and a dozen or
two lawyers. They may not be up to the law,
but are more apt to dispense justice, and dis-
pense with law. Most of the disputes in mining
camps—aside from brawls—are on questions
connected with location and claim, and on
these subjects the miners are as well posted as
anyone. In settling questions of this kind by
arbitration, much valuable time is always saved,
as well as money.

We have a great deal too much law in all
walks of life, and there is by no means so much
confidence in the justice of legal decisions as
there was formerly, since the justice is so often
entirely lost sight of in the web of legal techni-
cality. It really seems as if justice could be
more properly administered without the for-
malities and technicalities, when experience has
so frequently shown us what stumbling blocks
they are. Still people seem to cling to the old
traditions, and while blaming the legal fraternity
for its adherence to the "precedent," look with
shyness at anything for which precedent is
not shown. But awards by arbitration are re-
cognized by law and the practice is one very
ancient.

In such isolated localities as mining camps, or
farming communities, in new States and Terri-
tories, it seems as if award by arbitration would
work well. The system possesses the merit of
simplicity. When a dispute arises between
neighbors, involving property, where no
agreement can be satisfactorily made by the
parties themselves, other neighbors acting as
arbitrators are apt to come to a correct decision,
as if a whole court full of lawyers was em-
ployed. And what is important, in a new com-
munity, no money need be spent, or time
wasted. It has been found that in criminal
matters in mining camps the decisions of the
citizens, carried out promptly as they are some-
times, generally cure the evils they are intended
to remedy, perhaps as well as more formal pro-
ceedings.

It is not, by any means, intended to imply
that such a "committee of protection" should
usurp all the functions of the courts, but by its
help much needless litigation could be pre-
vented. Many mining camps have been kept
back for years by litigation which kept pend-
ing for months and months, when a vigorous
searching out of the truth, and prompt deci-
sion, would have been to the benefit, not only to
the litigants, but the whole community, for
the community suffers in these contests by the
cloud the litigation throws over the camp. The
Arizona miners have well named their committee,
therefore, for they can protect the people from
the evil effects of the quarrels of a few.

SAVING GOLD.—At the Indian valley mine,
Plumas county, every precaution is taken to
save the gold, which is very fine and difficult
to catch; an unusual proportion of silvered
plates is used, then there is a revolving cylin-
der, into which the sand from the batteries is
put and thoroughly worked to secure what
amalgam it may contain; after being worked in
this cylinder the sand is conveyed to an oscil-
lating pan where it is again shaken and ground
by pieces of iron and round balls weighing four
or five pounds. In the sluices that carry away
the tailings, boxes are placed that serve as traps
for catching any gold or amalgam that might
have escaped; these are examined every few
days, in order, not only that the gold may be
recovered, but also that the fact of its escaping
from the mill may be known, and the cause as-
certained and remedied.

BIG BEND TUNNEL.—In an item published
last week concerning the rapid work done in
the Big Bend tunnel, Butte county, in the mat-
ter of drilling, it was inadvertently stated that
the drills used were Ingersoll's, whereas the
whole drilling outfit in the tunnel is a Burleigh.

The President has appointed Norman H.
Camp, Superintendent of the Assay Office, I. T.,
vice William Walters, suspended.

PROFESSOR KOST proposes to make a geological
survey of Florida at his own expense.

Cupellation Loss in Silver Assay.

The term "cupellation loss" is applied to indi-
cate a minute loss of silver unavoidably sus-
tained in the process of cupellation in assaying,
which arises from a small portion of that metal
being mechanically carried along with the lith-
arge into the body of the cupel. The amount
of this loss increases with the quantity of lead
present in the assay (whether contained origi-
nally in the assay or added subsequently for the
purpose of slagging off the copper, etc.); it is
relatively greater, as the silver globule is larger,
but represents a larger percentage of the silver
actually contained in the assay, in proportion
as the silver globule obtained diminishes in size.
It has, however, been experimentally proved
that in assays of like richness in silver, this
loss remains constant, when the same tempera-
ture has been employed and similar weights of
lead been oxidized in the operation.

In the blowpipe assay this loss is not con-
fined to the ultimate operation of cupellation,
but occurs, though in a less degree, in the con-
centration of the silver lead, and in the pre-
vious scorification of the assay, had such opera-
tion preceded the concentration. The total
loss in the blowpipe assay is found, however,
to be less than in the ordinary muffle assay,
since in the latter case the whole of the oxid-
ized lead is directly absorbed by the cupel.

In mercantile assays of ore it is not custom-
ary to pay much attention to the cupellation
loss, and the results are usually stated in the
weight of silver actually obtained. Where,
however, great accuracy is required, especially
when the substances are very rich in silver, the
cupellation loss is added to the weight of the
silver globule obtained, in order to arrive at a
true percentage. The proper amount to be
added for this purpose in blowpipe work is
shown in the annexed table, which is slightly
modified by George Attwood from Plattner's:

Actual per cent- age of silver found by assay.	Cupellation Loss, or Percentage of Silver to be added to the actual percentage found by assay in order to show the true percentage of silver contained in same, the entire amount of lead in or added to the assay being the following multiples of the original weight of assay.															
	1	2	3	4	5	6	8	11	13	16						
99.75	0.23	0.32	0.39	0.45	0.50	...	...	...	...	...	
99.5	0.22	0.30	0.36	0.42	0.47	0.69	0.83	...	...	...			
99	0.20	0.26	0.32	0.39	0.44	0.64	0.75	...	...	...			
98	0.18	0.23	0.29	0.35	0.40	0.58	0.68	0.81	...	...				
97	0.16	0.20	0.26	0.30	0.36	0.52	0.61	0.74	...	...				
96	0.14	0.17	0.23	0.26	0.32	0.46	0.54	0.65	...	...				
95	0.12	0.15	0.20	0.22	0.27	0.39	0.46	0.55	0.62	...						
94	0.11	0.13	0.18	0.20	0.25	0.36	0.42	0.50	0.57	...						
93	0.10	0.12	0.16	0.18	0.23	0.32	0.38	0.45	0.51	...						
92	0.09	0.10	0.14	0.16	0.20	0.29	0.34	0.40	0.45	...						
91	0.08	0.09	0.12	0.14	0.17	0.25	0.29	0.35	0.39	0.46						
90	0.07	0.08	0.10	0.11	0.15	0.23	0.28	0.32	0.37	0.43						
89	0.06	0.07	0.09	0.10	0.13	0.17	0.19	0.23	0.26	0.32						
88	0.05	0.06	0.08	0.09	0.11	0.15	0.17	0.20	0.23	0.27						
87	0.04	0.05	0.07	0.08	0.10	0.14	0.16	0.18	0.21	0.25						
86	0.03	0.04	0.06	0.07	0.09	0.13	0.15	0.16	0.18	0.22						
85	0.02	0.03	0.05	0.06	0.08	0.12	0.13	0.14	0.16	0.20						
84	0.01	0.02	0.04	0.05	0.07	0.10	0.11	0.12	0.14	0.17						
83	...	0.01	0.03	0.04	0.06	0.09	0.10	0.11	0.12	0.14						
82	...	...	0.02	0.03	0.05	0.07	0.08	0.09	0.10	0.11						
81	...	...	...	0.01	0.02	0.04	0.05	0.06	0.07	0.08						
80	...	...	...	...	0.01	0.03	0.04	0.05	0.06	0.07						
79	...	...	...	...	...	0.01	0.03	0.04	0.05	0.06						
78	...	...	...	...	...	...	0.01	0.03	0.04	0.05						
77	...	...	...	...	...	...	...	0.01	0.03	0.04						
76	...	...	...	...	...	...	...	...	0.01	0.03						
75	...	...	...	...	...	...	...	...	...	0.01						
74	...	...	...	...	...	...	...	...	...	...
73	...	...	...	...	...	...	...	...	...	...
72	...	...	...	...	...	...	...	...	...	...
71	...	...	...	...	...	...	...	...	...	...
70	...	...	...	...	...	...	...	...	...	...

Lower California Mines.

The peninsula of Lower California no doubt
has many places where gold exists, which have
not yet been found, but the region is such a
barren and dry one that there is little encourage-
ment for prospectors. Even if they do find
gold, if it is not on very rich ground it will not
pay to work, owing to scarcity of water. There
have been mines worked there on a small scale,
in different localities, but Americans have made
very little money in the country. Every now
and then, however, we hear of new mines being
discovered, and news of one of those discovered
reached here this week. A dispatch from
Guaymas says: By the arrival of the schooner
Rambler, twenty hours from Moleje, the news
of the placer discovery in Lower California
is confirmed. Manuel Grejalba came over di-
rect from the mines and brings some six pounds
of coarse gold, among which is a gold nugget
weighing sixteen ounces. The major part of the
gold resembles that found at Mormon Gulch in
California. Being interviewed, Mr. Grejalba
said that the mines, so far as prospected, were
about five miles wide by about twenty in length,
and situated in a valley of the mountains some
two hundred miles from Moleje. There were
only a few natives at the mines when he left,
but quite a crowd on their way there. Mr.
Grejalba has found a gold quartz mine near the
seat of the placers, and only came over to get
supplies and tools for the working of his claim.
The mines are only some fourteen miles inland
from the Angel Gardia bay, opposite to Buron
island, where there is a good harbor, plenty of
water, wood, etc. A large party starts from
here on the Rambler, which leaves on Friday
and takes all she can carry. Mr. Garcia also
came over in the Rambler, and brings about
seven pounds of coarse gold. The town of
Guaymas is alive with miners anxious to reach
the other side. Another schooner has been laid
on, and will sail by the end of the week.

Working in Foul Air Underground.

It is one of the characteristics of miners that,
at every mining accident, even in fiery
collieries, there is a desire on the part
of the men employed, to enter the mine to
rescue their fellow workmen. There never
was an accident on this coast that there was
lack of volunteers to help imprisoned miners,
and upon the Comstock, particularly, many
instances of heroism and bravery may be re-
called. In England, where frequent accidents
occur in the coal mines, there are always plenty
of men to go into the dangerous galleries, and
a commission appointed to enquire into the
cause of mine accidents recognize this fact so
well that they now propose to instruct men in
the proper means of working in foul air, under-
ground, and having the necessary appliances
ready for use at any time.

In fact, the English Government has taken
hold of the matter and the Home office has
issued a circular to the mine owners, asking
them to take an active interest in promoting
arrangements, which may contribute towards
the general introduction of efficient means for
saving life. After proper examination, the
Secretary of State recommends the use of the
Flensburg apparatus, by which men may remain
in localities where the atmosphere is in a highly
vitiated or irrespirable condition. Practical
and conclusive proofs are cited of the readi-
ness and efficiency with which the Flensburg
apparatus can be applied to the saving
of life after explosions; and illustrations
unfortunately occur quite often that show
the necessity of having some such thing
ready for immediate use. It is suggested that
the system upon which lifeboat stations have
been organized and developed with such bene-
ficial results might be applied without difficulty
to the creation, in mining districts, of stations,
where the Flensburg apparatus should be stored in
sufficient numbers, and maintained in readiness
for immediate use, and where the instruction
of men from the surrounding coal mines in its
use, should be systematically carried out. A
rescuing party could thus be speedily on the
spot after the occurrence of an accident in a
particular district, in which a station had been
established. It is necessary, however, that the
men shall have some experience with the ap-
paratus and the commission suggests that cer-
tain collieries in each district should be supplied
with six sets of apparatus and lamps, together
with the necessary appliances for making and
compressing the gas required. At each of these
collieries, which should be in such a position
that a special train could be obtained and dis-
patched at the shortest notice a dozen or more
of the men who work there should be trained to
use the apparatus and lamp. Facilities are
also to be given to men working at other col-
lieries for learning how to use the lamps.

The apparatus to which we refer is thus de-
scribed in the Reports of Her Majesty's Inspec-
tors of Mines:

"The apparatus, which is carried upon
the back of the diver, miner or explorer, con-
sists of a strong sheet copper cylinder, twelve
inches by six and a half inches, with domed
ends, and capable of holding four cubic feet of
oxygen gas at a pressure of sixteen atmospheres.
Above the cylinder and attached to the side of
it, is a square metal box, twelve inches by
twelve inches by four inches, to contain the
carbonic acid filter, which is a box of vulcanite,
divided into four compartments, and with a
wooden lid made airtight by an india-rubber
washer, and having an inlet and an outlet tube;
this box is filled with a packing of ordinary tow,
interspersed with two pounds of stick caustic
soda; the exhaled breath passes twice up and
down through the interstices of the tow, by
which it is finely divided, and thoroughly freed
of carbonic acid by the caustic soda, the excess
of moisture collecting under a perforated false
bottom arranged for the purpose. A flat bag
of vulcanized india-rubber is fastened to the ap-
paratus, and is connected by an india-rubber
pipe over the shoulder to the outlet pipe of the
filter; the bag is also in communication with
the oxygen chamber, and the supply of oxygen
to the bag can be regulated by a jam screw
valve under the control of the wearer.

"An india-rubber mask is made to fit tight
to the face, and is held in place by straps buck-
led up at the back of the head; the mask is fitted
with a pair of flexible valved pipes, the one for
exhaling being in communication with the inlet
pipe of the filter, and the other for inhaling in
communication with the air bag. The exhaled
breath having passed through the filter enters
the bag in a purified state, and then meeting
with its complement of oxygen is fit to be again
inhaled. The bag being perfectly flexible, readi-
ly expands or contracts as the breath passes in
or out of it, so that no effort is required in res-
piration. Foster and Fleuss's patent safety

mining lamp is a modification of the limelight, methylated spirits of wine being used instead of hydrogen gas, and consists of a strong copper sphere, seven inches in diameter, and capable of being charged with oxygen at a pressure of from sixteen to twenty atmospheres. To the top of the sphere is attached a small spirit lamp, with two wicks, between which through a small jet a minute stream of oxygen regulated by an adjusting valve on the sphere, is allowed to pass, carrying the flame against a cylinder of lime held on a stand placed to receive it. "The light is covered in by a double dome-shaped metal casing, having an annular space left between its inner and outer surfaces which is filled with water; discs of plain glass are inserted opposite each other in the inner and outer casings, and a small outlet valve is fixed in the inner case near its lower part for the escape of the products of combustion, from the inside of the casing into the annular space filled with water between the two cases, through which the gases bubble and escape through another outlet valve fixed on the top of the outer case. The cover is attached to the lower part by means of a screw, an air-tight joint being made by a leather washer seating."

The inventors state that the lamp "will burn for four hours equally well under water, in carbonic acid, or in firedamp;" and that "it cannot get hotter than boiling water."

English Investments in the Pacific Coast Mines No. 4.

[Prepared for the MINING AND SCIENTIFIC PRESS by H. DEGRAD.]

The Last Chance S. M. Co. (Limited.)

The mines of this company are situated at the head of Bingham canyon, Oquirrh mountains, Utah. Though but little developed when purchased by the English company in 1872, the Last Chance lode showed in its upper workings a body of high-grade gold and silver-bearing ore. The company organized in London, with a capital of £100,000—20,000 paid up shares, £5 each. The company, having accepted the property on the favorable report of their own examiners, proceeded to open up the mine in a systematic and thorough manner, erecting at the same time suitable works for the reduction of the ore, considerable quantities of which were disposed of at a good price before these works were got in readiness. During the first year of the company's existence, there were disbursed to the shareholders seven dividends of two shillings each—fourteen shillings in all, the last dividend having been paid in July, 1873. While the ore in the upper portions of the mine carried so much lead that it could not well be milled, there was still not enough to fit it for treatment by smelting. To supply this deficiency, the company bought the Hooper lode, lying contiguous, the ore from which, though poor in the precious metals, being high in lead, was mixed with that from the Last Chance mine, the two turning out a considerable amount of fair-grade smelting ore. For a couple of years the company was tolerably prosperous, when, the line of permanent water in the Last Chance mine having been reached at a depth of about 400 feet on the vein, the ore changed from oxidized to sulphuret, rendering it so intractable that it could neither be smelted nor disposed of on the market. In this dilemma the company, instead of providing concentrators, or putting up suitable reduction works, as they should have done, suspended operations, there being at the time some debts outstanding against them. These debts remaining unsatisfied and others accruing, no net earnings having meantime been made, the property was attached and sold, after which the company in London went into liquidation and their affairs were finally wound up. This done, a new company, called the Last Chance Consolidated, was formed, the most of the shares in which were taken by the members of the old company. The property was redeemed, but the new concern being delayed clearing away the financial wreck and settling other preliminary matters, did not get into the field and fairly at work until the fall of 1880, since which time the company have been engaged in further developing their mines and putting them in shape for future production, no net earnings during the interim having been made.

Although the new company is believed to have a valuable property, they have not as yet put up any additional reduction works, it being their policy to avoid further expenditures until their mines have been so fully proven that they will run no hazard in incurring such expenditures to a reasonable extent. They have it in contemplation to drive a tunnel that while it drains the Last Chance mine will serve as an adit for the removal of the Hooper ores, the erection of concentration works also entering into their future plans. There have been opened up between fifteen and twenty thousand tons of ore in the Hooper mine. This ore is poor in silver, averaging only about twelve ounces to the ton, but rich in lead, carrying from thirty to forty per cent of that metal. Under the new administration both mines have been worked on tribute, the miners receiving about seventy per cent of the ore extracted and the company the balance, the latter taking and selling the whole of the ore and dividing the proceeds in the above proportions.

Pursuing this policy the company realized enough profit to defray current expenses, effecting the thorough exploration of their mines at the same time. The ore in the lower workings of the Last Chance mine, now filled with water, though base, was rich in gold and silver at the time operations were suspended there. No attempts will be made to unwater this mine till the projected tunnel shall reach the lode. Parties conversant with the situation are of the opinion that the prosperity that marked the early history of this property will, under the

superintendent, having heard big stories of gold mines in South America, suddenly made a break for that country; the foreman, for these or other reasons, having also lit out for parts unknown. The general manager, who resided at Salt Lake City, instead of stopping as he should have done at the mines, sent up another superintendent to fill the places so unceremoniously vacated, offering the new incumbent a handsome bonus on condition that a certain quantity of ore were gotten out in a specified time. The result was that a good deal of lime

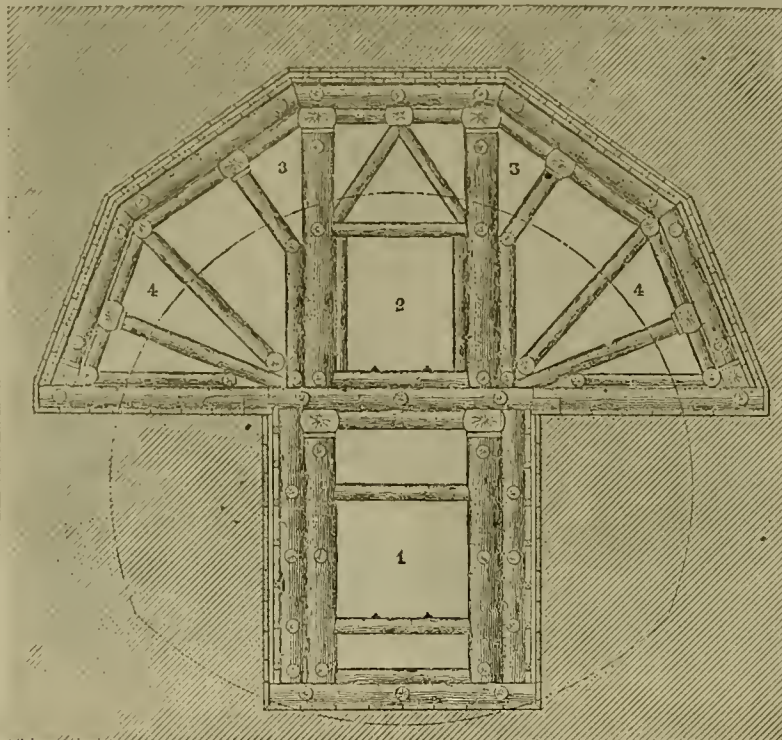


FIG. 1.—AUSTRIAN SYSTEM OF TIMBERING IN OPENING TUNNELS.

present judicious management, be eventually restored to it.

The Davenport and Matilda Mines.

Located in the Little Cottonwood canyon, were sold to an English company in 1872. Prior to the sale the Davenport lode had been somewhat developed, a little exploratory work having also been done on the other lode. Four or five hundred tons of ore, carrying about twenty per cent lead and fifty ounces of silver to the ton, had up to that time been extracted and shipped or smelted. The new owners, on their coming into possession of the property, erected two

rock was sent to the surface and made to do duty for ore. And so, between incompetence, dishonesty and extravagance, matters went from bad to worse, and the company getting heavily in arrears to their workmen and others, their property was attached and finally sold to satisfy the claims of their numerous creditors. Passing into other hands these mines have since been worked with moderately good results, though their upper levels are now about exhausted; and if production is to be kept up, further exploratory work will have to be done, to which end new and costly hoisting and pump-

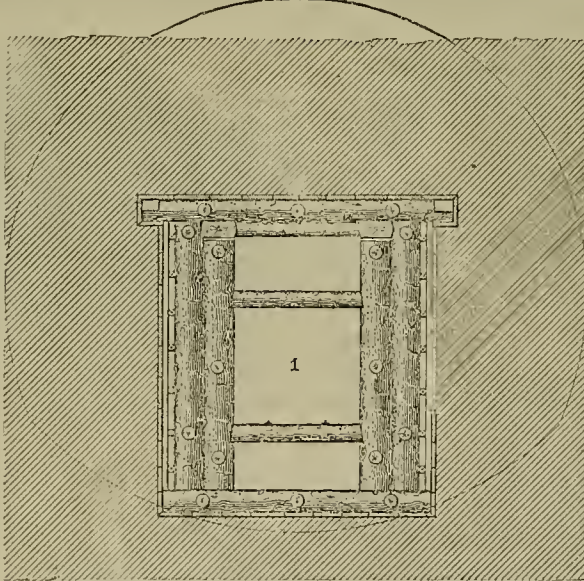


FIG. 2.—BOTTOM HEADING FOR TUNNEL.

furnaces, with a joint capacity of fifty tons per day. Large and commodious buildings, with very complete machinery, were put up near the mouth of the canyon, the motive power being water obtained from Cottonwood creek. Numerous buildings, with hoisting works, were erected at the mines, a substantial tramway having also been laid down for facilitating the transportation of the ores from the mines down to Grizzly Flat, at the head of the canyon, where they could be loaded on wagons. A steam saw mill was brought in and quite a town built up at Grizzly Flat, situated a short distance below the mines, the expenditures of the parties in charge having been liberal, not to say lavish, from the start.

Although the mines for the first year or two produced tolerably well they made no net earnings and finally failed to meet current expenditures. Seeing how matters were going, the

ing machinery will be required. The money invested by the shareholders proved a total loss.

The Story of the Tacoma Venture.

Another of these Utah failures, being short, is quickly told; the enterprise, in so far as bullion production is concerned, having been abandoned in its infancy. The mine bearing this name, the latter given also to the English company who bought it, is located in the Lucin district, Goshute mountains, near the Nevada line and about seven miles south of the Central Pacific railroad. The property was purchased by parties in London in 1872, and the next year outfitted with a smelting furnace having a daily capacity of twenty tons. Results not coming up to expectations the furnace was shut down after a few weeks' run. From this time on no further efforts at working the mine were made by the new owners, though it has since been worked, off and on by other parties.

During the year 1875, there were shipped from this mine to the Jordan and Galena smelters, 354 tons of excellent ore. The ownership of the property appears to still rest in the English company, though they have not had the practical control of it for several years past. There was a rumor not long since, that the company, in London, intended to re-ascend the mine, which, judged by all accounts, is a reasonably good one, and should never have been neglected the way it was. The ore here consists of the carbonate of lead, with very little sulphuret, but containing enough oxide of iron to flux it. It is a good smelting ore and carries a fair percentage of silver and lead with a little gold. The geological features of the district are similar to those about Leadville, the formation being lime and the ore masses capped with a heavy deposit of iron. Mining operations here have to be carried on under some disadvantages, the country being destitute of timber and but poorly supplied with water. These drawbacks are, however, in a measure, compensated for through the proximity of the district to the railroad. Besides the Teconathere are numerous other metalliferous lodes in the Lucin district, all carrying similar ores, and on some of which a good deal of work has been done. Although several of these lodes make a line showing of ore, the output of bullion and the ore shipments here have been comparatively limited; the entire district, for some reason or other, appearing to have always rested under a cloud. Despite this, the mines are well spoken of by many good judges who have visited and examined them, and it is probable enough that a mining enterprise set on foot here would, if well conducted, meet with success.

Timbering in Mines.—No. 9.

The Austrian Tunnel System.

A cause assigned for the sinking of the top-timbers in the early Austrian tunnels, has been insufficient propping of the face. As soon as these faces are pressed inward into the tunnel-space, the top-heading sinks. Care must therefore be taken, in treacherous or very soft ground, to hold this face well back. Finally, came the question of how to dispose of the "timbering" in its erection so as to cause each successive piece added to form an integral part of one homogeneous whole system. It has been customary, in the Austrian system, to place the upper center timbers first, and then the lower, beneath the middle sill, and this has been done even in the softest material. This, of course, necessitates undermining and underpinning the upper set after it has once been placed. If the ground is moderately firm this method may be carried out with no great trouble, but in very bad ground undermining of timber is always disadvantageous. Even a slight loosening, caused by this undermining, may shake all the timbering above.

Looking into the matter, the later Austrian engineers, and notably Mr. Rziha, have advocated the "Firstenbau," or bottom breaking in system. As thus applied, the bottom-heading is, first of all, driven throughout the tunnel, serving at once as an adit for the water, giving also free ventilation and establishing the alignment of the tunnel definitely. Then this can be enlarged to a higher and wider heading, the bottom timber of which ultimately acts as the bottom sill of the tunnel timbering; its cap is the subsequent middle sill, and its side props are the legs of the subsequent lower center frame. To strengthen this frame the horizontal longitudinal bars are placed beneath the cap, as shown in Fig. 2.

This bottom heading (Fig. 2) being completed, as a rule the ground above has been so well drained as to offer no very serious difficulties in excavation. The top-heading is then constructed, and the advantage of this method of procedure evidently lies in the building from below upward. The lower set acts as a foundation for all the subsequent work, and remains undisturbed in its position, as it was first placed. Moreover, this high heading again serves to further drain out the sides before the enlarging is begun.

This latter is commenced on the right and left at the top, and thence continued, as shown in Fig. 16. The excavation of the sidewalls is then begun, and the full excavation taken out. First 1 is cut out, then 2, then 3, and then 4. The center then proceeds downward. The main tunnel is shown by dotted lines.

This timbering of the full area of tunnel having been finished in sections of six, nine, or eighteen feet, according as the ground may permit, the masonry is begun. As the arch goes up, the props to the roof-timbers are removed, and the latter are stayed by temporary props resting on the centres, until the arching reaches them and they can safely be removed. Where the material is not too loose, the lagging also is taken out.

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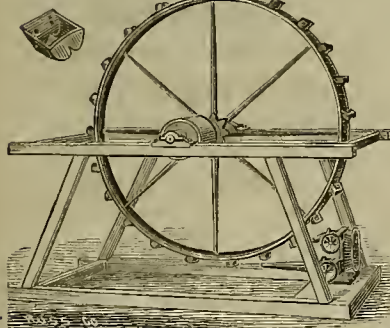


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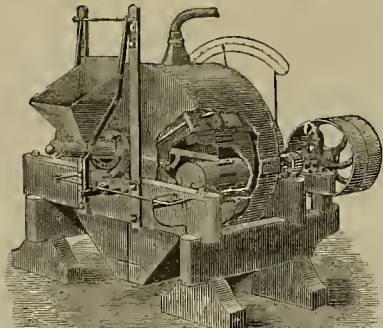
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR THE WEEK ENDING MAY 8, 1883.

- 277,103.—CHURN—H. Baldridge, Los Angeles, Cal.
 277,250.—ICE CREAM FREEZER—F. Espel, S. F.
 277,269.—LIFE PRESERVER HOLDER—Wm. P. Gray, Ainsworth, W. T.
 277,285.—FEED WATER HEATER AND PURIFIER—Jas. W. Hubber, S. F.
 277,134.—CRUSHING MILL—F. A. Huntington, S. F.
 277,141.—BUCK SAW—E. A. Learned, S. F.
 277,143.—CARPET FASTENER—Emma J. Lewis, S. F.
 277,300.—CAR COUPLING—J. C. Look, Yuba City, Cal.
 277,148.—FRUIT BASKET—R. E. Morey, S. F.
 277,330.—REFRIGERATOR, FILTER AND WATER COOLER—T. C. Nativel, Brooklyn, Cal.
 277,350.—BRAKE BLOCK—M. J. Signeira, Brooklyn, Cal.
 277,361.—STEAM BOILER FURNACE—R. L. Slater, S. F.
 277,365.—BOILER TUBE STOPPER—William F. Smith, Tucson, A. T.
 277,174.—HAY RAKE AND LOADER—E. B. Towl, Franktown, Nev.
 277,177.—CURVED ROTATING PLOW FOR SUBMARINE WORK—A. W. Von Schmidt, S. F.
 277,395.—SOLE TRIMMING AND CHANNELING MACHINE—J. H. Wiegand, S. F.
 277,013.—FRUIT DRIER—W. C. Doherty, Sacramento, Cal.
 277,122.—INCORUSTATION PREVENTIVE—George Downie, Salinas City, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

FRUIT BASKET.—Roswell E. Morey, S. F. No. 277,148. Dated May 8, 1883. This invention relates to certain improvements on fruit and berry boxes or baskets, which are composed of thin wood shavings, or veneers crossing each other at right angles on the bottom, and having their turned-up sides united at the top. These upper edges are united in various ways to insure strength and sufficient rigidity by wires, continuous strips of metal, etc. This invention is designed to utilize short strips of sheet metal in the construction of baskets of a considerable size; and it consists of a strengthening strip of metal clamped upon each of the four sides, and enclosing at their meeting angles, wires, either short or continuous, which are properly bent and secured by crimping the metal upon them.

CHURN.—Herman Baldridge, Los Angeles. No. 277,103. Dated May 8th, 1883. In the operation of this churn, the peculiar form and position of the dasher revolving on a horizontal axis in a vertical vessel, when taken in connection with the curved sides of the vessel, a particularly advantageous effect is produced, in that the cream is not dashed against the maximum resisting surface, as would be the case if the vessel had flat sides, but is rather swept around the curved surface, following the direction imparted by the wall of the vessel, and is thus not beaten so severely as to injure the texture or grain of the butter, and at the same time the operation of the driving crank is rendered easier.

REMOVING TIRES.—Nelson B. Hervey, Santa Rosa, Cal. No. 275,909. Dated April 17, 1883. The device is intended for removing tires from wheels, and it consists in a leveled disk or roller upon which the edges of the tire rest, and in a pressure-roller adapted to impinge upon and force down the felly of the wheel. Means for vertically adjusting said pressure-roller and causing it to rotate, complete the invention. The usual manner in which tires are removed is by hammering. This, besides being very laborious, sometimes splits the felly and otherwise injures the wheel. The object of the invention is to remove the tire by a steady pressure, applied in the most advantageous manner, and with the exercise of small power.

BUCK SAW.—Edward A. Learned, S. F., assignor of part interest to H. S. Dunder and H. L. Welch. No. 277,141. Dated May 8, 1883. This relates to certain improvements in saws of that class, known as buck saws, in which the tension of the saw is maintained by the constant action of a spring frame or spring attachment. In this class of saws it is extremely difficult to force the end frames together and hold them while the pin is being put through the frame and saw to hold the latter in place. This invention is designed to obviate the difficulty by the use of a spring latch or latches, which open to admit the end of the saw-blade, and then engage with suitable notches therein so as to hold the saw firmly when the strain is again brought upon it.

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A very great number of mechanical and chemical means have been tried to prevent the incrustation of steam boilers. One would be surprised to learn the variety of substances which have been employed to that end, some of them quite curious in their nature to be applied to such an object. It has remained for a California inventor, however, to be the first to utilize the eucalyptus in this connection, which adds another to the various uses to which this very useful tree has been put.

The invention consists in introducing into the boiler an infusion, decoction or other preparation of eucalyptus, either the wood, bark, leaves, blossoms and capsules, or any part which will produce the desired effect, said infusion either made separately, and afterwards introduced into the boiler, prepared in the feedwater prior to its introduction into the boiler, or prepared within the boiler itself, so as to remove any scale which may have been already formed, or so as to affect the water as to prevent the incrustation of the boiler by any substance which may be held in solution or suspension in the water, and at the same time avoid any injurious effects to the shell of the boiler.

There are many modes of applying the eucalyptus, such as boiling the leaves or other parts, making a cold infusion, or in other ways extracting the desired substance, which may be afterward introduced to the boiler, as required, either with the feedwater or by a cnp or chamber into which it may be placed, and by suitable cocks admitted to the boiler; or the leaves may be put in a receptacle and put in the boiler. The charge to be used and the frequency of renewal depends on the size of the boiler and the character of the water used, this being easily determined by inspection.

Of course, the inventor is aware that tannin or tannic acid is inherent in the eucalyptus, and that tannic acid in various forms has been used to remove scale. But tannic acid injures the boilers in the absence of any other element to counteract the effect of the tannic acid on the metal after it has performed its work on the scale. He does not pretend to give any theory of the chemical action of the eucalyptus, but he has demonstrated to his own satisfaction and that of others, by long continued experiments, that the eucalyptus will remove scale from boilers, or keep them free from scale without injuring the shell of the boiler itself, and will also prevent any rust or corrosion.

The inventor of this process is George Downie, of Salinas, Monterey county, who has just received his patent through the MINING AND SCIENTIFIC PRESS Patent Agency. Mr. J. McGilivray, of Oakland, is associated with him, and patents have been applied for in Great Britain, Germany, and other foreign countries, so highly important is the invention considered. A company is to be formed to extract the acting elements from the substance by steam process, and prepare the extract for foreign shipment. California is the only part of the United States where the eucalyptus family flourish, which they do here as well as in their native home, Australia. Where frosts occur, however, the tree does not do well.

We are informed that this substance has been applied with great success in very many places. In some cases where applied, the sediment has dropped off in pieces, and in others it has precipitated like a thin paste or mud. This seems to depend on the water. Some eleven months have been passed in trying the various experiments which have been made.

In Salinas, where the remedy was discovered, the water is very bad for boilers, so much so that the railroad people will not use it in their engines. Yet the inventor states that it has removed scale from boilers there, and prevented its forming. At the Buckeye mill, Marysville, it was tried to remove the scale from three old boilers, and put into two new ones to prevent any forming, all supplied from the same heater where the leaves are applied, and, Mr. McGilivray tells us, it acted equally well in both cases. In a number of boilers in this city it has been efficient, notably at the Baldwin hotel, where the well water caused rapid incrustation, and nothing had heretofore been able to remove the scale.

The hoisting works of the Alaska mine, at Pike City, Sierra county, were destroyed by fire last week. This disaster will prove a serious set-back to the company.

A good medicinal tonic, with real merit, is Brown's Iron Bitters, so all druggists say.

News in Brief.

EIGHT hundred emigrants, assisted by the government and Tukey's committee, embarked at Galway, for Boston, on Saturday.

THE Canada Pacific Railroad will be completed by December, 1886, which is four years earlier than the contract stipulates.

It is reported the Cree Indians are preparing for a war to avenge their losses during their late horse-stealing raid into Montana.

THE Digger Indians of Placer, Nevada and El Dorado counties are about to hold their annual conclave of mourning for the dead.

IN New York the local steamboat inspectors refuse certificates to ferry-boats that store their illuminating gas in tanks in their holds.

It is reported from Salt Lake that an extension of the Union Pacific will be made through central and southern Nevada to California.

The various potentates of Europe and Asia are slowly converging to Moscow to participate in the coronation festival at the end of the month.

It is announced that negotiations are pending between the Union and Central Pacific for bringing overland trains six hours earlier into San Francisco.

THE sensational developments of criminal practices in the opium dens of New York have led to an investigation of similar dens of iniquity which infest Chicago.

THE building boom in Great Britain is marvelously prosperous, and railway construction seems to be almost feverishly active. Public works are starting up everywhere.

THE present is the severest spring ever known in Nevada, and vegetation is at least six weeks backward. There will be fine pasturage, however, when the grass does get a fair start.

THE Brooklyn Bridge Trustees have fixed the fare for foot passengers at one cent. The disbursements thus far on account of the construction of the bridge amount to \$14,689,905.

THE Mountain View Immigration Society has been organized by colored residents of Stockton. The Society has for its object the bringing of negroes from the Southern States to the Pacific coast. The men are for farm laborers and the women for house servants.

THE Trustees of Columbia College, New York, have prepared a plan to receive young women for a four years' course outside of but under the supervision of the college; graduates to be entitled to the same honors as the young men who have taken the regular course.

It is stated that there is to be a scarcity of cocoa. The rebellion in Ecuador has prevented the natives from gathering the cocoa crop there; the revolution in Hayti has reduced the crop in that restless island, and in Colombia dry weather and grasshoppers have destroyed the entire crop.

THE trestlework railroad bridge now being constructed across Lake Pontchartrain will, when completed, be twenty-one miles in length and will be the longest bridge of the kind in the United States. More than 15,000,000 feet of lumber outside of the piles will be used in its construction.

W. W. McCoy, of Corral de Tierra, says the Salinas *Index*, has a well that goes dry during the rainy season for about three months, while in the dry season it constantly flows a stream of pure water. Within three rods of this spring is another from which an abundance of water runs the year round.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct, or if the paper should ever come beyond the time desired be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time, we cannot be responsible for the errors or omission of agents.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

Our Agents

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

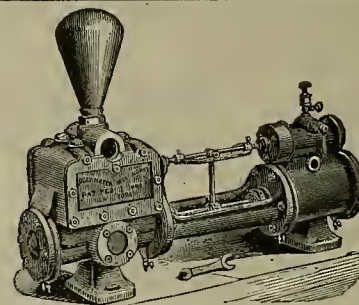
G. W. McGRAW—Santa Clara county.
 M. P. OWEN—Santa Cruz county.
 J. W. A. WRIGHT—Merced, Tulare and Kern counties
 JAMES C. HOAG—California.
 B. W. CROWELL—Arizona Territory.
 N. H. HARGOOD—Plumas county.
 M. H. JOSEPH—Eureka, Nev.
 F. W. STRATTON—Placer, Nevada and El Dorado counties.
 I. M. LEBHY—Los Angeles, San Bernardino and San Diego counties.
 A. C. KNOX—Oregon and Washington Ter.
 M. D. SHRAVER—San Mateo county.

Cash in Advance.

Our terms are cash in advance for this paper. NEW NAMES will not be entered on our printed list until payment is made. Feb. 1, 1884.

Complimentary Sample Copies of this paper are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage; and as far as practicable aid in circulating the journal and making its value more widely known to others and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year.

N. B.—Personal attention will be called to this (as well as other notices, at times) by turning down a leaf.



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Mine and Mill Machinery

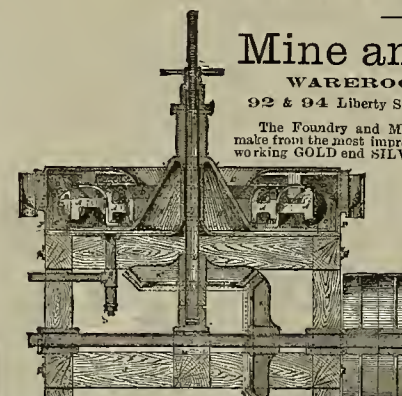
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Steel SHOES and DIES for Stamps, and Mine and Mill Supplies. MINER'S HAND ROCK DRILL. Information and Estimates cheerfully given. Send for Catalogue. Address, THE MOREY & SPERRY MINING MACHINERY CO.

MOREY'S IMPROVED PULVERIZER,

For WET or DRY Crushing.

SIMPLE, EFFICIENT and DURABLE.

The Balls revolve horizontally without friction. 5 ft. size, weight 1,000 lbs., and does more work than 15 Stamps, 3 ft. size, weight 1,500 lbs. Concentrating Mills, Rock Breakers, Amalgamating Pans and Separators, Roasting Furnaces, Hoisting and Pumping Machinery, Engines and Boilers, any size required. Hydraulic Cylinders and Pumps, Ore Cars, Ore Buckets, Safety Cages, The Hard Power Two-stamp Mill weight 250 lbs. THE EUREKA WIRE LOPE TRAMWAYS, Concentrating Riffles for Mills and Hydraulic Sluices.

Agents for INLAY ORE CONCENTRATOR and the

California Quartz Mines.

The *Daily Transcript*, Nevada Co., Cal., says: Interviews with many of the mine owners and employes in mines, show the quartz mining interests of this locality to be particularly prosperous at this time. From one end of the district to the other the industry is enlarging, and yet not one out of a hundred of the good claims are developed. In illustration of the assertion that the development of our resources in that line has scarce been begun, we desire to call attention to the impressions of a gentleman who, about a year ago, came here from the East to examine a particular quartz mine in this township. He remained here several days after attempting to his special mission, and no part of the district was left unnoticed by him. On the day of his departure, in conversation with one of our mining men, he said: "Let me tell you one thing. I have visited every mining center on the Pacific coast, as my special business is to make a thorough examination of properties for Eastern capitalists, and I assure you that in my judgment, the outlook for an immense mining industry in Nevada City is second to that of no other district. The whole surroundings indicate a vast network of ledges that will take ages to work out. Why, sir, there has nothing been done around here in the way of opening up the immense wealth that lies buried in the ground. Instead of there being eight or ten mills running, I believe that within ten years there will be eighty or a hundred, and they will all be doing as well, if not better, than those at work now, provided you can get capital in here to take hold of your mines. This district is bound to come to the front, and the fine prospects should entice capital to your doors. There is something substantial about your mines that we seldom find in other sections. They are lasting, and that is what is going to keep up your town and make property very valuable here for years to come. This district has been scratched over a little, and that is about all that has been done in the way of quartz mining. If there never had been any Comstock, Nevada City and Grass Valley would now have a population of ten or fifteen thousand apiece instead of six or seven thousand, and these hills would be alive with men. Never mind, my word for it you will see it yet."

The gentleman referred to is no enthusiast, but cool, clear-headed and scientific, as well as a practical miner, and his words were well considered. The quartz interest has been growing slowly for the past five or six years, and each year as it rolls by shows an increased bullion shipment and new mines added to the list. There is no excitement here, but everything goes along quietly, and the large number of men employed shows that the mines are in a healthy condition. There is not a mine in the district that is a stock gambling proposition, but all of them are owned by men who have personal supervision of them. The amount of gold taken out, or the profits, are known to no outsider, and we may say that is one great reason why Nevada City does not with the outside world assume the high place that it actually deserves. If the whole truth about the mines was published in the local papers, where one dollar is brought here for investment there would be thousands; but the owners take the ground that they are conducting private business enterprises, the same as a grocer or dry goods dealer, and the public has no right to ask for a statement as to the results. Their mines are not for sale, and they have as great a dislike for having an impression go out that there is any attempt to "boom" the properties, as a hen does for a swim in a mill pond. Such a course acts as a barrier in keeping capital away. For instance, an attempt is made to sell a mine to parties who are not familiar with this section. The first question asked is, "Have you any paying mines in this district?" The reply is, "Yes; such and such mines." "How much do they take out per month or annum, and how much does the best and poorest rock pay?" "I don't know exactly, but know that they pay largely for the investment." That is about all that can be said, and its very indecency gives rise to a suspicion of something wrong, and scares the capitalist into giving the district a wide berth. If the situation of our mines could be given to the public as at Virginia City, Bodie and other places, Nevada City would be as familiar a name all over the world as any mining camp on the coast. The Idaho mine is the only one in Nevada county that publishes its dividends, and everybody knows there are a number of others that are paying comparatively as well.

SMELTING FURNACES.—The Southwest *Scientist* (New Mexico) says: Messrs. Fraser & Chalmers have recently taken the contract for all the material to enlarge the works of the Benson Smelting & Reducing Company of Benson, Arizona Territory, composing two water-jacket galena smelting furnaces and all material and machinery necessary to complete them. These works are the most successful west of Denver; they are managed by Carl Henricks a metallurgist of great experience and ability. Fraser & Chalmers have also been awarded the contract for furnishing the boilers and motive power complete to drive the electric machinery for the Brush and Swan lights now being placed at Albuquerque, New Mexico, for lighting the city and suburbs.

CARE-WORN persons, students, weak and over-worked mothers will find in Brown's Iron Bitters a complete tonic, which gives strength and tone to the whole system.

Oh, My Back!

That's a common expression and has a world of meaning. How much suffering is summed up in it.

The singular thing about it is, that pain in the back is occasioned by so many things. May be caused by kidney disease, liver complaint, consumption, cold, rheumatism, dyspepsia, overwork, nervous debility, &c.

Whatever the cause, don't neglect it. Something is wrong and needs prompt attention. No medicine has yet been discovered that will so quickly and surely cure such diseases as BROWN'S IRON BITTERS, and it does this by commencing at the foundation, and making the blood pure and rich.

Wm. P. Marshall, of Logansport, Indiana, writes: "My wife has for many years been troubled from pain in her back and general debility incident to her sex. She has taken one bottle of Brown's Iron Bitters, and I can truthfully say that she has been so much benefited that she pronounces it the only remedy of many medicines she has tried."

Leading physicians and clergymen use and recommend BROWN'S IRON BITTERS. It has cured others suffering as you are, and it will cure you.

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TUESDAY..... JULY 31, 1883.

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YOUNG LADIES,
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Next Term commences July 16th. Send for Catalogue to

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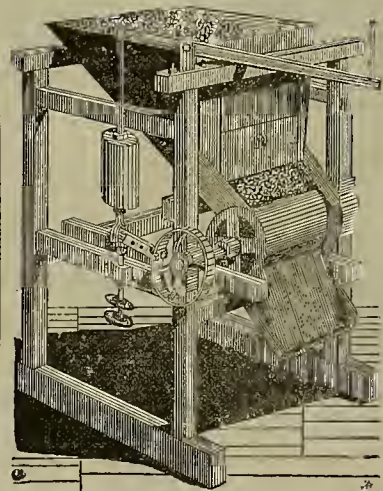
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This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery, as required. In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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Manufacturer of all kinds of Chemical Stoneware —FOR— Manufacturing Chemists. Also Chemical Bricks for Glover Tower.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

Seaton Gold Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Drytown, Alameda County, California.

NOTICE.—There are delinquent upon the following described stock, on account of Assessment No. 2 levied April 10, 1883, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Scott, E. A.	4	10	\$ 75
Warner, Alex.	5	10	75
Martin, A., Trustee	6	5,000	375 00
Martin, A., Trustee	7	5,000	375 00
Martin, A., Trustee	8	5,000	375 00
Martin, A., Trustee	9	5,000	375 00
Martin, A., Trustee	10	1,000	75 00
Martin, A., Trustee	11	1,000	75 00
Martin, A., Trustee	12	1,000	75 00
Martin, A., Trustee	13	1,000	75 00
Martin, A., Trustee	14	1,000	75 00
Martin, A., Trustee	15	1,000	75 00
Martin, A., Trustee	16	1,000	75 00
Martin, A., Trustee	17	1,000	75 00
Martin, A., Trustee	18	1,000	75 00
Martin, A., Trustee	19	1,000	75 00
Martin, A., Trustee	20	500	37 50
Martin, A., Trustee	21	500	37 50
Martin, A., Trustee	22	500	37 50
Martin, A., Trustee	23	500	37 50
Martin, A., Trustee	24	500	37 50
Martin, A., Trustee	25	500	37 50
Martin, A., Trustee	26	500	37 50
Martin, A., Trustee	27	500	37 50
Martin, A., Trustee	28	500	37 50
Martin, A., Trustee	29	500	37 50
Martin, A., Trustee	30	4,000	300 00
Martin, A., Trustee	31	900	67 50
Davis, John A.	32	90	6 75
Martin, A., Trustee	33	5,000	375 00
Martin, A., Trustee	34	5,000	375 00
Martin, A., Trustee	35	5,000	375 00
Martin, A., Trustee	36	4,000	300 00
Kellogg, C. W.	37	100	7 50
Martin, A., Trustee	38	5,000	375 00
Martin, A., Trustee	39	5,000	375 00
Martin, A., Trustee	40	5,000	375 00
Martin, A., Trustee	41	5,000	375 00
Martin, A., Trustee	42	10,000	750 00
Fisher, Butler C.	43	100	7 50
Cornwall, P. B.	44	4,800	360 75

And in accordance with law, and an order of the Board of Directors, made on the 10th day of April, 1883, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at 625 California St., Room 6, San Francisco, Cal., on TUESDAY, the 5th day of June, 1883, at the hour of 1 o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with cost of advertising and expense of sale.

A. MARTIN, Secretary.

OFFICE—Room 6, 525 California St., San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, May 2, 1883.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 54, of Twenty-five Cents (25c) per share, was declared, payable on SATURDAY, May 12, 1883, at the office in this city, or at the Farmers' Loan and Trust Company, in New York.

WM. WILLIS, Secretary.

OFFICE—Room No. 29 Nevada Block, No. 309 Montgomery street, San Francisco, California.

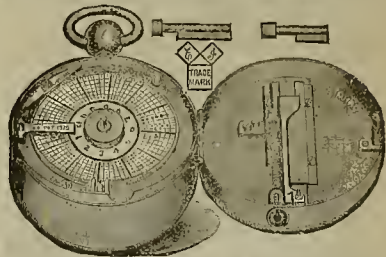
NOTICE!

The annual meeting of the GAGNERE MINING COMPANY will be held on the FIFTH day of JUNE, 1883, at 126 Kearny Street, Room No. 11.

GEORGE R. WILSON, Secretary.

IMHAUSER'S

Watchman's Improved Time Detector,
WITH SAFETY LOCK ATTACHMENT.



(Patented 1875-G 7-80-81.)

Beware of imitations. This instrument is supplied with 12 keys for 12 stations. Invaluable for all concerns employing night watchmen. Send for Circulars to

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To Prospecting Quartz Miners.

Miners having reliable properties in California, and who are willing to give one-half of their interest in the same for suitable machinery, may benefit themselves by corresponding with me. ALMARIN B. PAUL,
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Hoisting Engines of all Kinds.

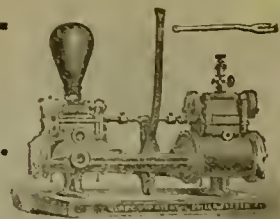
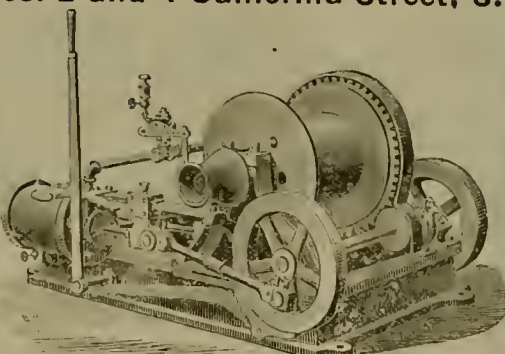
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Disston's Circular Saws.
Frank & Co.'s Wood Working Machinery.
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More Than 16,000 In Use.



The Korting's Injector is the simplest, cheapest and best in use. Will draft its own water, hot or cold, and feed under varying pressure. Send for Circular.



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IRON AND STEEL WIRE HOISTING ROPES.

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HORIZONTAL AND VERTICAL ENGINES
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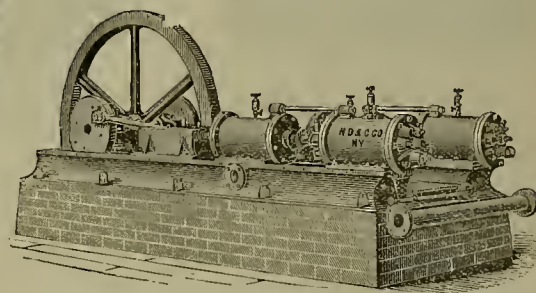
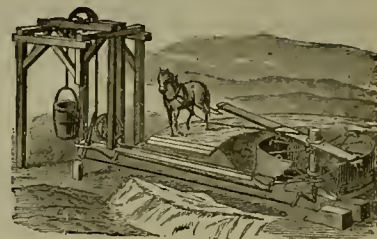
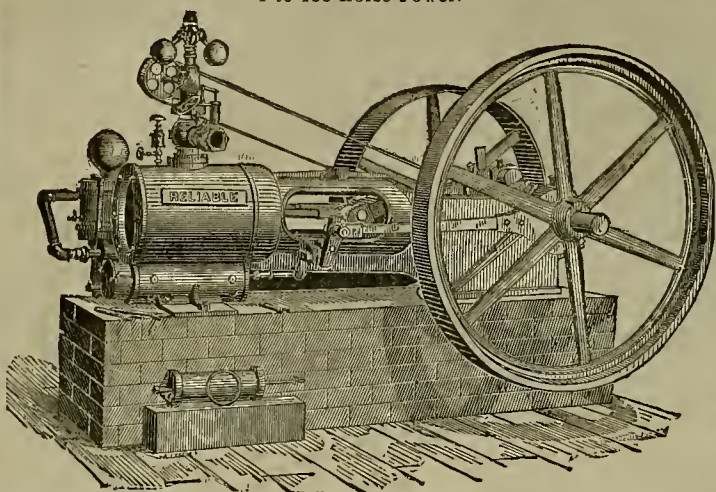
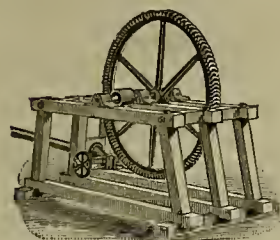
MINERS' HORSE-WHIM

One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The whim is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of the whim is bolted to bed-timber, thus avoiding all frame work. When required these whims are made in sections to pack on mules.

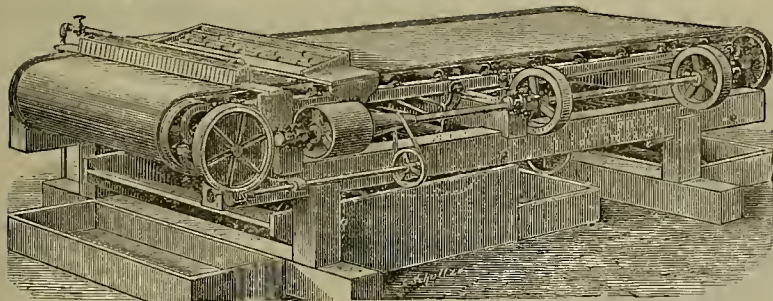
NATIONAL DUPLEX COMPRESSOR.



KNIGHT'S
Mining Water Wheel.
OVER 200 IN USE IN CAL.



\$1,000 CHALLENGE!



THE FRUE ORE CONCENTRATOR,
—OR—
VANNING MACHINE.

Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order, and ready to make tests, at the office of Hinkley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringers.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

Room 7, 109 California Street,
Nov. 6, 1882.

SAN FRANCISCO, CAL.

THE CONSUMERS' COMPANY.

VULCAN B B,

Black Glazed Powder,

In kegs and cases. The Best Low Grade Explosive in the market. Contains no Nitro Glycerine. Superior to Judson or any Black Powder made.

Is Unequaled for Bank Blasting & Railroad Work.

VULCAN NOS. 1, 2 AND 3,

The Strongest, Most Uniform and best Nitro Glycerine Powder manufactured, and which we are prepared to furnish at very lowest prices.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California St., San Francisco.



JAS. LEFFEL'S TURBINE WATER WHEEL, The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

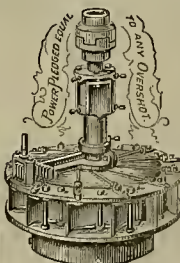
Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power.

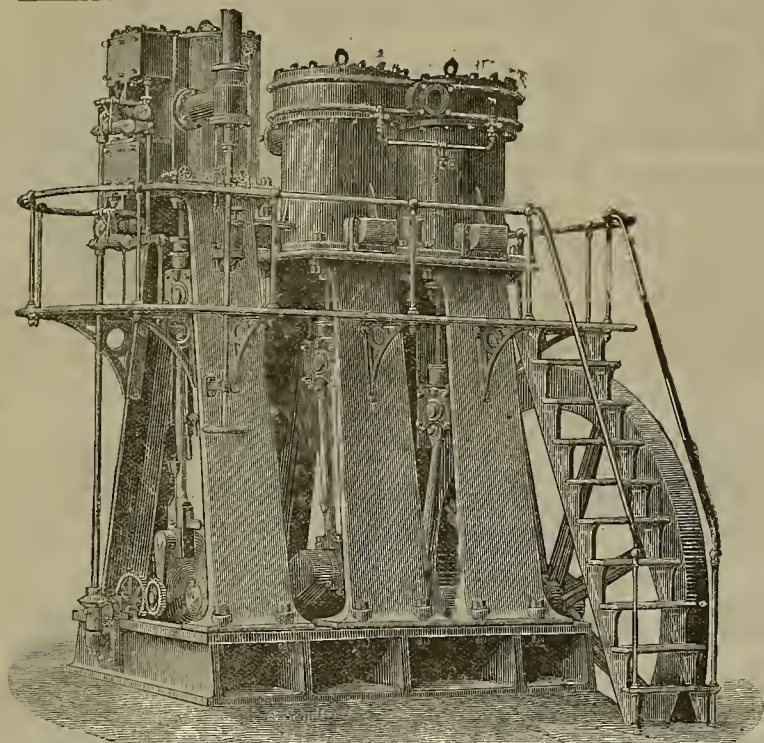
Those improving water power should not fail to write us for New Prices, before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York City

PARKE & LACY, General Agents, 21 & 23 Fremont St., S. F.





Mining Machinery Depot,

PARKE & LACY,

21 and 23 Fremont Street. S. F.

NO. 7 IMPROVED

AIR COMPRESSOR.

SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

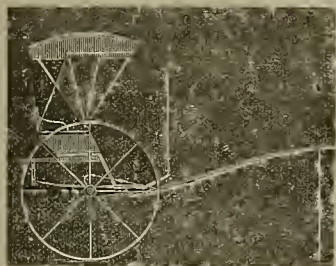
Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts

Small Sizes made in Sections not to Exceed 300 lbs.

Price's San Leandro Village Carts.



Phæton Style, with Calash Top.



Piano Box, without Top.

What People are Saying about San Leandro Village Carts:

The following extracts from letters are samples of what I am constantly receiving, and not one of them was solicited, but are merely incidental portions of correspondence about sales:

SALINAS, Dec 11, 1881.
FRIEND PRICE:—The cart came all right. Have driven around town a little, and am much pleased with it. I think it a success, and ought to make you a fortune. Now turn yours if loose and make me something handsome, with pole and shafts, full lazy rack, etc. (Here follows specifications, etc.) Also send me one grade A. phaeton style.
Yours truly,
PARIS KILBURN.

LAKEPORT MILLS, April 5, 1883.
MR. JACOB PRICE:—I was in S. F. a few days ago and purchased one of your carts, and I like it first-rate. I think I can sell several here. If agreeable will act as your agent in this place. Respectfully, etc.,
M. STARR.

SACRAMENTO, April 14, 1883.
JACOB PRICE, San Leandro.—Dear Sir: Cart received. All O. K. I consider your guarantee (as to riding qualities and remaining level) fully sustained in every particular. In fact, I have never ridden in any but more easy. It is superior to anything I have seen here in Sacramento, and that is saying a great deal, for there are five different makers. Anything I can do to aid you in making sales I shall do cheerfully. I send you \$100 by Wells, Fargo & Co. Yours truly,
F. M. PAGE, Int. Rev. office, Sac.

POINT ARENA, Apr. 16, 1883.
MR. J. PRICE.—Dear Sir: I have now used the cart I purchased of you some days, and find it all anyone could wish for, and can say it is the BEST ONE MADE, as I think I have seen them all. I have to get out frequently and let parties try it, although I do not exactly like to do so, but I make that all right. I think you will receive at least 20 orders during the next few months from parties who have seen mine. I know four already who will call on your agents in the city the first time they visit the bay. Yours truly,
R. B. PHILLIPS.

GUARANTEE:

All of my Village Carts, of all grades and styles, are warranted to be wholly free from that annoying and ludicrous bobbing motion common to other two-wheeled vehicles, and to be so constructed that they can be instantly made level, whether a large or small horse is used or a light or heavy load is carried, and to ride as easy as the best buggy.

For Catalogues, with illustrations of various sizes and styles, and full information as to prices address
Truman, Isham & Co. 511 Market St. S. F. Jacob Price, Inventor and Manufacturer, San Leandro, Cal.

Pacific Rolling Mill Co..

SAN FRANCISCO, CAL.

MANUFACTURERS OF

RAILROAD AND MERCHANT IRON,

ROLLED BEAMS, ANGLE, CHANNEL AND T IRON, BRIDGE AND MACHINE BOLTS, LAG SCREWS, NUTS, WASHERS, ETC., STEAMBOAT SHAFTS, CRANKS, PISTONS, CONNECTING RODS, ETC., ETC.

Car and Locomotive Axles and Frames, and Hammered Iron of Every Description.

HIGHEST PRICE PAID FOR SCRAP IRON

Orders Solicited and Promptly Executed.

Office, No. 502 Market St., UNION BLOCK.

EMERY WHEELS and GRINDING MACHINES.

The Tanite Company.

STROUDSBURG, MONROE COUNTY, PA.



Orders may be addressed to us at any of the following places, at each of which we carry a stock.

SAN FRANCISCO, CAL.

Nos. 2 and 4 California Street.

PORTLAND, OREGON,

No. 43 Front Street.

CHICAGO, ILLINOIS,

Nos. 152 and 154 Lake Street.
And 40 Franklin Street.

ST. LOUIS, MISSOURI,

No. 209 North Third Street

ST. LOUIS, MISSOURI,

Nos. 311 to 319 North Second Street

GOLD QUARTZ and PLACER MINERS'

Silver Plated

AMALGAMATING PLATES,

For Saving Gold.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 2,000 ORDERS FILLED.

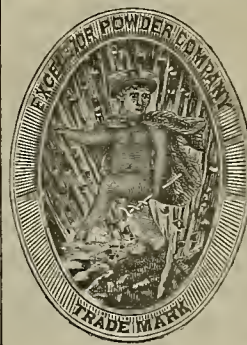
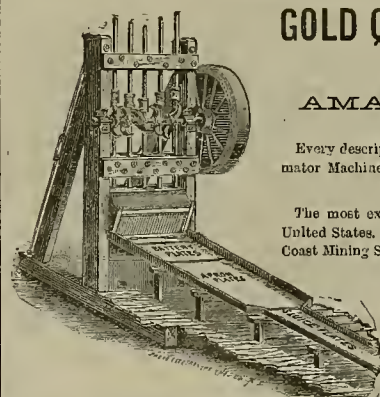
The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought, or gold separated for low percentage of result.

SEND FOR PRICE LIST.

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653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Proprietor.



EXCELSIOR BLASTING POWDER,

Manufactured by the

EXCELSIOR POWDER COMPANY.

This is no new, patent, non-explosive Safety Powder, but the Genuine Standard Nitro-Glycerine Powder, as safe to use and handle as any other Nitro-Glycerine Powder manufactured. The fumes and gases, common in nitro-glycerine powders, are destroyed, and do not leave the miner with headache or nausea.

The powder is put up in cartridges of any size to suit the consumer, and is exploded in the same manner as all other high explosives; that is, by means of cap and fuse, or by electricity. It is not claimed for this powder that it is a non-explosive, or safer than other nitro-glycerine powder. All powder, and especially nitro-glycerine powder, should be handled carefully. The EXCELSIOR POWDER is as safe, and for strength far surpasses any other powder on the market. Address all orders to

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MAY 26, 1883.

VOLUME XLVI
Number 21.

Lodes in Placer Claims.

Although numerous instances have occurred where ledges have been found in placer claims, there are a number of legal questions involved where such circumstances exist, that have not been settled. The United States Land Office has lately been dealing with some of these. In one case where a patent was issued for a placer claim as far back as 1876, a lode claimant applied for a patent on his lode claim within the limits of the placer claim, in 1880, alleging that the lode was known to exist at the date of application of the placer claim. There was conflict of opinion on the question of whether the lode was known to exist at the time of the first application. A hearing was had to determine the question, and the Register and Receiver found from the testimony that at the time of the issuance of the placer patent, January 14, 1876, there was no "known ledge or quartz lode, or other rock in place bearing gold, silver, tin, lead, tin, copper, or other valuable deposits." And upon appeal to the Commissioner of the Land Office, that official reviewed the testimony and affirmed the finding of the local officers.

When the Land Office directed the inquiry to be made as to whether the lode was known to exist at the time of the placer application, the lode claimant swore the placer claimant knew at the time it did exist. Now comes the Secretary of the Interior and says that this brought the case within the rules established by the Department in the late case of Becker vs. Sears and War Dance lode vs. Church Placer, in which it was held that the lode must be known to exist at the time of application. He directs that all proceedings subsequent to the lode claimant's application for patent be dismissed without prejudice, and that the lode claimant be permitted to proceed in compliance with the statute. The adverse claim can then be made and the controversy settled by the court. The lode claimant's application was rejected on the ground of conflict with the patented placer claim.

California Iron.

The furnaces of the iron mines at Clipper Gap, Placer county, in this State, began turning out iron this week, which is now being shipped here. It will be remembered that some months since, by an explosion and fire at the works, a serious loss was incurred, and that the works had to be rebuilt. The owners were not discouraged, however, but went ahead, and now they have everything running again.

This is the only iron mining we are doing in California, although iron is found in many parts of the State. The Clipper Gap iron is first-class, and is purchased as fast as produced. Arrangements are now being made at the Judson works to put up the necessary works to make wrought iron of the pig from these mines. The rolling mills already built there will be extended as soon as iron can be supplied for them from this source, and it will not now be long before this is done.

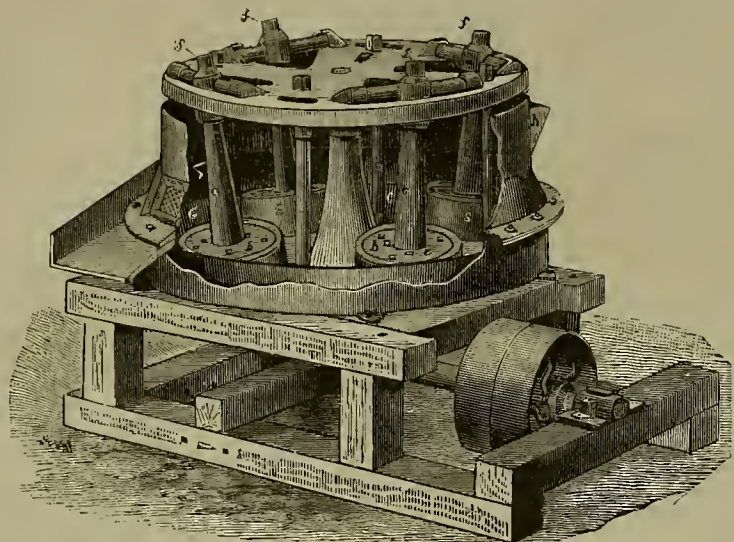
It is in industrial enterprises of this character that much of the future welfare of this State depends. We have been dependent for iron on our imports, and this home product will be of great assistance. Of course, this mine cannot nearly supply the demand. Still, it reduces the importation appreciably. The new furnaces work well, and the iron turned out is "No. 1" in every respect. It is to be hoped that it will not be very long before other iron deposits in this State will be developed, so that some time in the future we will be independent and be able to produce all our own iron.

Huntington's New Crushing Mill.

Frank A. Huntington, of this city, has devoted considerable attention of late years to mining machinery, and especially ore-crushing appliances. He last week obtained a patent on a new crushing device through the MINING AND SCIENTIFIC PRESS Patent Agency, and which is illustrated in the accompanying engraving. It

be replaced when worn out. These shoes may be made of cast iron, but the large interior die *G* of the pan is of wrought iron, because it will wear smoother and not become chipped.

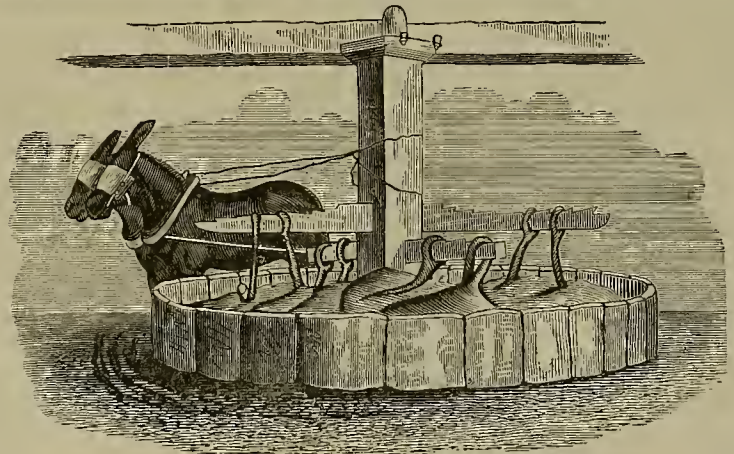
The rollers *b*, have vertical stems or shafts *c*, to which they are fixed vertically and the shafts extend up into or through sleeves *f*, in which they are fitted to turn. These sleeves have horizontal trunnions which turn in boxes on the



HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.

consists of a pan having an interior circular die around its periphery, and, in combination with this, of a series of rollers, which roll against the die, being suspended by vertical shafts turning in sleeves which have horizontal journals above, so that the rollers may swing rapidly. The suspending mechanism is supported upon a cross or frame, which is driven by a central

frume which is keyed to a central shaft. Scrapers serve to lift the material from the bottom of the pan as the rollers do not touch the bottom of the pan, so that it will be carried between the roller and the die until sufficiently fine to pass through the screen. The rollers are allowed to swing to and fro from the center of the pan, and when the frame is rapidly ro-



PRIMITIVE METHOD OF GRINDING ORE

shaft, and the rollers are thus thrown outward against the die by centrifugal action.

In connection with this apparatus, Mr. Huntington employs scrapers, which are carried around by the frame and throw the material to the outside, where it will be acted upon by the crushing rollers until it is fine enough to pass through the screens on the sides of the pan above the crushers, as shown in the cut.

The engraving shows a portion of the pan broken away so that the mechanism can be understood; *b* represents the rollers, which have cylindrical shoes surrounding them, which may

tated the rollers will be thrown outward by centrifugal force so as to crush anything which may pass between them and the die, *G*, surrounding the inside of the pan. The ore is fed through a hopper, *h*.

Mr. Huntington says that this mill has worked very well at the Whidder mine, El Dorado county, in this State. It is constantly crushing, and has a good discharge. The cost of erection and freight are small. He says, also, it is a very good amalgamator, saving fully nine-tenths of the gold in the mill.

CALIFORNIA capitalists have purchased thirty-six sections of railroad land northwest of Sprague, W. T.

Influences on Shots in Blasting.

Blasting may be defined to be the rending or tearing apart of any solid body, by the pressure or shock exerted upon it from the sudden development of gas of high tension, evolved on the ignition of some explosive compound placed contiguous to it. This is the definition given by Drinker in his work on "Tunnelling." As the drilling of the holes may be said to be the dearest part of blasting it follows that great care should be taken in setting each hole in such a position, and in drilling in of such width and depth, as to insure the greatest effect at the least cost. When the many circumstances which may influence the effect of a shot are recalled, it is evident that the proper setting of a hole is a matter rather of practice based on experience, than one to be decided by empirical rules, for even were a set of rules deduced from experiments in one material, they would only apply, under similar circumstances, in the same material. The effect of a shot may be influenced, among other considerations, by:

1. The shape in which the rock is presented, the size and number of the open faces, the shape of the piece it is desired to take out, if that is an object, and, of course, primarily, in the size of the cross section of the face if it is heading work.

2. The texture of the rock, whether it is hard or easy, firm or loose, brittle or tough; thus experience gained in blasting close grained, hard granite, trap, gneiss, etc., would not apply to sandstone, limestone or slate.

3. The structure of the rock, as to whether it is stratified, laminated or fissured; upon its cleavage, etc., and upon whether it is massive or broken.

4. The elasticity of the rock.

5. The explosive used.

6. Whether the hole is to act alone, or simultaneously with, or following others; and in the case of simultaneous firing, the question arises of how the waves of oscillation will best act in concert.

7. The character of the fuse and tamping.

Working Ore.

An engraving on this page will be recognized by many as the means employed in Mexico very extensively, and in Arizona, New Mexico and California, more or less, for working ores. The apparatus is a very simple one to make, and a couple of mules furnish the motive power. Arastras, Chile mills and appliances of similar construction are very good amalgamators and work much closer to real value of ore than more complicated machines. But they do their work slowly. Perhaps, however, time is an element of success in amalgamation more than is generally recognized. The American plan is to work the material through as quickly as possible; but Mexicans do not value time so much, so perhaps they get better results on this account.

TIMBER ON MILL-SITE.—The Commissioner of the General Land Office has given the following opinion: "If the mill-site claim is timbered, there would seem to be no good reason why the lawful claimant should not be permitted to cut and remove the timber thereon for the purpose of constructing a mill, reduction works, tramways or other accessory required in the development of his mining interests. In permitting the removal of the timber from such mill-site or tract of non-mineral land prior to the issuance of patent therefor, it is strictly forbidden to make such timber an article of sale for private gain or speculation."

Early History of the Comstock—No. 4.

EDITORS PRESS:—Claimants are becoming quite numerous for "who made the first assay of Comstock ore?" I desire to say, that from my own knowledge the first ore assayed was by H. W. Theall & Co., in Marysville, Cal., in May, 1859. The ore was brought from Washoe by one Elija McCurdy, who, after knowing the results, went to Nevada City, and remained there until the last of June, when, in company with Shep McFadden, Sam Beard and Bart Kinch, they arrived here on the 9th of July, and entered into a contract with Len Savage and Chase, to run a tunnel for one half of the ground, which contract was completed, and is well known to old Comstockers. All the parties sold out their interests for considerable sums. So as you see, if Dr. Linsweert's friend, Major R. Killalee, did not bring his ore to San Francisco until July 28, 1859, he was behind some time. The Savage tunnel had been run one hundred feet by that time and ore had been shipped to Sac, via Placerville, from the croppings of the Ophir. In July it was an "open secret" in Marysville and Nevada City, that silver ore had been discovered, and in August Johnny Newman had completed his house, and by September had killed an Irishman, who was known as Sailor Jack, formerly of Forest City, Cal. So you will see the Doctor is "off."

ROBERT G. LOWERY.

Virginia City, Mar. 15, 1883.

Arizona Outlook.

The Arizona Gazette says: The interest in mining affairs throughout this Territory has less of the sensational, and far more of the practical and lasting about it, than we have ever previously known. In Yavapai, Mohave and the counties south of us, this industry is being prosecuted with vigor, and our own county, although she bears the name of being the leading agricultural section, is not far behind in the matter of her mining industries. New and rich mines are being discovered in the districts north of us, and it is but a question of time before we will lead the most favored sections of our Territory in the production of the precious metals. Castle creek, with its immense and rich deposits of copper and silver, will soon be added to the list of producers. Cave creek, Winifred, Magazine and other districts equally as rich, have felt the depressing effects of bad management; many mines in which, were forced to shut down.

This state of affairs has happily been relieved by a general change of management; men of good sense and practical mining experience have entered into the business with a view to fully develop their properties and put them on a paying basis. Confidence in the richness of their mines is gradually but surely returning, and all that is needed to confirm this is the erection of reduction works. As soon as these facts are known, and are found to be reliable, the money which now lies molding in the safes of capitalists waiting for investments will circulate in this direction, and we will then enter upon an era of stable prosperity hitherto unknown in our Territory. To persons seeking investments in mines of worth, we cordially extend an invitation to visit the mineral resources of Maricopa county.

A NEW FIND.—The Exchange mine at Monte Christo, was one of the richest drift claims in that section in early days, and the ground was supposed to have been thoroughly prospected and worked out. It seems, however, that several experienced miners, known as Thatcher & Co., have been engaged in looking for a possible bonanza in the old claim for some time past. People know more about drift mining now than they did twenty years ago, and in this instance a fine prospect is encountered in a mine that was virtually abandoned by former owners. Thatcher & Co. merely raised up about forty feet above the old workings and discovered a new channel. Our informant says that the new channel has every appearance of proving extensive and rich. There are numerous other so-called worked out gravel claims in the county that experienced prospectors might do well to try by paying a little attention to them.—*Sierra Tribune*.

BORING FOR GOLD.—A new plan of prospecting for placer gold is by using an auger of a peculiar form that bores a hole about three feet in diameter—indeed, what might be called a shaft. Speaking of an operation of this kind, the *Plumas National* says: The work of boring Mills' big shaft is going steadily on, and about 156 feet of tubing is now in. The borer goes down from two to three feet per day, and for the past two weeks has been cutting through a beautiful bed of blue gravel, which contains some gold. There are many indications that the bedrock will show good pay, and the best miners who visit the shaft are highly pleased with the character of the gravel.

The agent of the Gold Stripe Mining Co., Plumas county, expects to be able in a few days to make a proposition to parties who have claims against the property, to offer fifty cents on the dollar, in liquidation for the same. If this offer shall be accepted it is likely that operations will be begun at the mine without delay, otherwise, he says, nothing may be done this summer.

The Coming State.

The Resources of Washington Territory.

Governor Newell, of Washington Territory, while at the national capital as a commissioner, delegated by various municipalities, corporations and prominent citizens, to urge upon Congress the early admission of their Territory as a State, was interviewed by a reporter of the Washington Post and asked what claims, other than the one of 125,000 population, he would urge.

"I cannot reply better than by stating what our resources are, and thereby demonstrating our ability to sustain ourselves as a State. We consider that we have the ability to assume the functions and bear the expense incidental to Statehood."

"What are these natural resources upon which you base your claim to be self-sustaining?"

"Leaving out Alaska, Washington Territory is the extreme northwestern possession, and lies between the Pacific ocean and Idaho, British Columbia and the Columbia river. It contains 70,000 square miles, aggregating 450,000,000 acres. It is divided by the Cascade mountains, an extension of the Sierra Nevada, which run nearly north and south into two separate regions, differing essentially in their characteristics, and called respectively east and west Washington. The latter occupies about two-fifths of the Territory, and is known as the Puget Sound basin. The surface is hilly and in some portions mountainous. Four fifths of this surface is covered with dense forests, the trees being of great magnitude. They consist of white and yellow fir, cedar, hemlock, spruce and pine, with smaller quantities of ash, elder, oak, pine and maple. The fir tree especially reaches, when full grown, an enormous size, the average tree measuring four feet with an altitude of from 250 to 300 feet. Many monstrous specimens are found, some fourteen feet thick. This variety is found nowhere outside of Vancouver's Island, Washington Territory, and Western Oregon. It is highly bituminous, tough, elastic and enduring, and especially adapted to the construction of naval vessels in all their parts."

"Have you nothing but trees, Governor?"

"We have other resources equal in value to the wood, which I will tell you about after I have told you about the huge cedars we have. We have gold, silver, copper, zinc, cinnabar, tin, plumbago, mica, soapstone, marble, granite, sandstone, and limestone; all these are found within our limits. To utilize our timber, saw mills of large capacity are operating upon Puget Sound, the largest of which is at Port Ludlow, a new structure, complete, but not yet in operation, being 436 feet long and 200 feet wide. It has a cutting capacity for 218 foot logs. The amount cut last year was 35,000,000 feet. This is sent to the Pacific coast, Asia, Australia, France, England, and the Nile. There are 12,000,000 acres of such timber, worth hundreds of millions of dollars. There are cedars in existence twenty-one feet in diameter in all parts of the Territory. The bark of the fir tree is used mainly for fuel. The forests are filled with elk, deer, bears, foxes, rabbits, grouse, pheasants, ducks, and other game."

"Have you any coal deposits?"

"Gen. McMicken, the Surveyor-General of the Territory, informed me in a recent interview, that the entire Puget Sound basin is underlaid with coal. The indications are apparent everywhere. The varieties are bituminous, lignite and anthracite. Extensive mines have been opened at Seattle, Tacoma, and along the line of the Northern Pacific. The mines at Seattle and Tacoma are extensively operated, each town having facilities for loading vessels at the rate of 1,000 tons a day, the mines being located within one hour of rail communication from the bunkers, at which the vessels are laden. Four steamships of 3,000 tons capacity are already established upon a line which supplies Oregon and California. Five more are to be added."

"What else have you?"

"About 7,000,000 of acres of Puget Sound basin is easily convertible to the best agricultural and grazing lands. The river bottoms, the heavier dam meadows and other alluvial deposits furnish a soil of inexhaustible fertility. The islands of the Sound are also highly productive, and indeed the entire surface of the country, when denuded of its timber, if that day could arrive, is especially well adapted to grazing and grain raising. White clover seems to be indigenous to the soil, and is absolutely irrepressible in its growth wherever the sun shines upon it. But the great agricultural and grazing portion lies east of the Cascades, the great plateau of the Columbia. Here are 30,000,000 of acres of land—prairie land—undulating and mountainous, mainly bare of vegetation, save sagebrush and bunch grass. Nearly all of this country is capable of producing, under proper cultivation, prodigious amounts of wheat, rye, barley, oats, flax and cultivated grasses. The census report indicates an average wheat crop of twenty-seven and a half bushels to the acre, the largest average yield mentioned there. I have seen a field of 2,000 acres which yielded an average of thirty-five bushels. Of these 1,000 acres averaged fifty bushels. The season for seeding extends nearly equally well from October till May, and for harvesting, from July to December. The straw being firm and strong, stands, and the hull, being firm, prevents the grain from falling out. During last season, 250,000 tons of surplus wheat were sent out of the Territory, and the estimated production for the next three years is 350,000 per year. Not

one acre in a hundred, even then, will be under cultivation. The grain is especially adapted for export, not being injured by transportation."

"What kinds of fruit grow in your would-be State?"

"Fruits grow luxuriantly to great perfection, and many native to warm latitudes, such as prunes, etc., grow well. Vegetables also grow exceptionally well. Stock is raised extensively; beef cattle, of which 250,000 head were exported last year; dairy cows, sheep and swine all thrive and prosper."

"How about your coast line?"

"Washington is destined to be a great maritime and commercial center of the Pacific coast. Puget Sound, the great Mediterranean of this continent, covers an area of 20,000 square miles, has a shore line of 2,000 miles, an average width of seven miles, and a depth of thirty to 200 fathoms, which is free from rock, bar or shoals. It ramifies through the main portion of Western Washington, furnishing easy and safe outlet to the world for the products I have told you about, and also communication. The rivers afford inland navigation of 2,000 lineal miles, the chief being the Columbia, which runs north-west 200 miles through Eastern Washington, bearing the waters which drain an area of 400,000 square miles. Seven hundred miles of railroad are already built. The Sound is connected with the Columbia, and connections will soon be made with the Atlantic and seaboard by means of the Northern Pacific, which will be completed this fall, 300 miles only having to be constructed, two hundred miles of the road bed for which is made. These waters are inhabited by salmon, halibut, trout, cod and eighty other varieties of fish; \$3,000,000 worth of salmon was canned last year on the Columbia river."

"Have you any towns, Governor?"

"The towns are comparatively small. The chief of these are Seattle and Walla Walla. Other towns exist elsewhere, and many are springing into existence. Churches of the various denominations to the number of 300 are in full operation. The system of education is simple. Sections 16 and 31 of every township are donated by the Government for school purposes. A university is in successful operation in Seattle. There are eight daily and thirty weekly papers, all conducted with decency and ability."

"The finest climate in the country?"

"The climate is the most remarkable feature of western Washington. The thermometer during the winter averages forty degrees above zero. The summers are delightful, being free from heat, thunder showers, or other evils and inconveniences that attach to hot climates. The scenery is grand, the Olympic and Cascade ranges being 15,000 feet high, with many others of nearly equal altitude, covered with eternal snow, present scenes of grandeur not surpassed elsewhere."

"No drawbacks to this Arcadia?"

"There are two things that might be considered so. There is a wet and a dry season, the former extending from January to March. This is considered by some people disagreeable, but it is essential to the great vegetable productions. High winds also prevail in Eastern Washington. These are the only complaints I have heard in a residence of three years. A country more agreeable in its personal surroundings has yet to be discovered, so far as I have experienced."

"And you want to be a State?"

"The people are especially desirous of availing themselves of the advantages of Statehood, being conscious of being able to sustain themselves and do honor to the Union."

Black Hills Copper Mines.

For four or five years past attention has been attracted to wonderful copper and silver lodes about twenty-five miles northeast from Prescott, in the Black Hills, but not until within the last year has any considerable work been done in that section with a view to their proper development. Mr. Ruffner, some four years ago, located several ledges, and made an effort to induce gentlemen of means to take hold and assist him in examining their true merit, but in this he was unsuccessful. Again about one year since he made an effort and was more successful, as Hon. Hugo Richards had expended some means in finding out that heavy bodies of ore actually existed in the Black Hills, and it was then that Gov. Tittle and Prof. Thomas went in there and satisfied themselves in the premises, and purchased the interest of Mr. Ruffner, and went to work properly developing the property. To-day over 100 men are at work building a road into the copper fields, and machinery manufactured at Chicago upon patterns of Rankin & Brayton, of San Francisco, has been purchased, and is now at Ash Fork, within fifty miles of the mines, awaiting the completion of the road, when it will be placed in position, and bullion by the wholesale will be the result. In this district, other well-known gentlemen own several of the gilt-edged mines, among whom is Lieutenant Kingsbury, now of Fort Mason, near San Francisco. The works going on will bring these outside properties into prominence and open an avenue for their development.

It is thought that the road will be completed the next sixty days. Those who have seen this property agree with Prof. Thomas that it is very valuable, and justifies the outlay in making the costly improvements now going on, or in the words of Col. Sellers, "there's millions in it."—*Arizona Miner*.

Marysville.

The Salt Lake Tribune says: From time to time much has been written and said in regard to Marysville being the center of a large mining and mineral section, and as possessing vast reserves that only need a more thorough development to place it among the leading ranks of ore-producing communities. It would seem, from a critical examination of all the geological conditions which go to make up vast mineral areas, that this region was pre-eminently fitted to become, in the near future, one of the leading ore sections. Such being the case, the question naturally arises, why is there not a better showing given at the present time on some of the leading properties in the way of shipments of bullion output, and why is there not more capital invested?

As an answer to the first, it can be said the owners are quietly working away on some of the leading mines, not wishing to make much noise as the developments progress, preferring to make sure before commencing the reduction of the ores, that they have true and permanent mines, and that plenty of ore may be on hand, so that the run for its reduction may prove continuous.

As an answer to the second, it may be said that unfortunate management in some of the leading properties here, has had its demoralizing effects to a greater or less extent, in keeping out capital that would otherwise have invested.

There is one thing, however, certain, and that is, if this section has not given the showing that other mining camps of the Territory equally endowed have, it is not owing to any want of mineral resources. Marysville possesses every natural facility for a successful mining camp, but unfortunately her selection has not been for the best, during the past year or two, in getting parties at the head of affairs who would work for the best interests of the community.

We have a ten-stamp mill here, as good as new, but is at present lying idle, and as good as dead property to the owners.

There are some as fine properties here, as can be found in any mining camp in the Territory, and perhaps a greater variety of precious metals exist here than in any other section of the country.

Prominent among some of the most conspicuous mines at present is what is known as the Lucky Boy. This property is situated just above the Deer Trail and directly beneath the Plinto. The Lucky Boy has every condition in its favor for being another Horn Silver lode. It opens out first as a salinide of mercury lode, but as depth is attained the mercury seems to play out with the change of formation, and at the end of the present workings an incline of about 140 feet, run at an angle of 15° to 20°. The formation changes from what was originally a block chrysolite formation to that of the heaviest spar. The specific gravity of this spar must be exceedingly great, as it seems when hauled to be equal in weight to gold. Black sulphurets of silver are just beginning to come in this spar, and the probability is that within the next 10 or 15 feet run in on the spar, something in the way of gold and silver will be brought to light that will far eclipse the legends of the Arabian Nights; and this is no idle boast or exaggeration, but present indications give every inducement for that belief.

DEBTS.—In the Superior Court at Marysville, Monday, before Judge Keyser, in the debris suit of Yuba county vs. Eureka Lake & Canal Company Consolidated, the court fined the defendant \$250 for contempt of the injunction to cease discharging debris into Yuba river. The motion was on purely technical grounds. An injunction was issued and served when suit was commenced six months ago, but has been entirely disregarded by the defendant. There were four unsuccessful attempts to serve the order in regard to the contempt on defendant's agent, and service was finally made on defendant's attorneys. This is a new proceeding in the slickens suits.

A QUARTER of a million dollars' worth of bullion has been shipped from the Bonanza King mine, at Providence, San Bernardino county, from January 1st to the 1st of May—four months—all done with a ten-stamp crusher. For the month of April, a twenty-five days run, the bullion output was \$58,000, being the reduction of 568 tons of ore.

THE Greenville Bulletin of Plumas county Col., says: All the mining sharps in the county ridiculed Mills for sinking a shaft in American valley, but now that blue gravel has been struck and traces of gold found, the sharps begin to weaken and think that there may be some thing in geology and scientific mining, after all.

A CIRCULAR received from Battle Mountain announces that Frank Green of that place has concluded to erect smelting works there, and will smelt ores at \$20 per ton. He will pay railroad charges on ores, and customers will have the privilege of handling their own bullion, or he will dispose of it for them.

A SECOND payment of \$216,666 was made by English capitalists for the Drim Lummon mine of Montana, on the 18th of April, also 100,000 shares of the company's stock (on third of the whole) was also delivered to the seller, Thomas Cruse, who retains a large interest in the mine.

MECHANICAL PROGRESS.

Lubrication.

A subject which does not generally receive the attention it deserves was brought before the members of the Manchester Association of Employers, Foremen, and Draftsmen, at a recent Saturday meeting, in an interesting paper read by Mr. J. Veitch Wilson, on the lubrication of ordinary bearings and of bearings and faces subject to the action of steam. Mr. Wilson dealt with the question in an exhaustive manner. With regard to ordinary bearings under normal atmospheric conditions, he laid down that the lubricants to be employed should possess the following essential properties: They must not be inflammable under 350 degrees Fahr.; they must not act upon the metals with which they come in contact, nor oxidize, which would lead to spontaneous combustion and clogged machinery; they must have body adapted to the work to be done; their boiling-point must be sufficiently high to prevent evaporation and ensure durability, and their freezing point must be low enough to insure regularity of feed from oil cups and convenience in handling.

As the result of numerous experiments, he had become convinced that mineral oils were, used alone, unsatisfactory lubricants; but arising in mind the fact that mineral oils could be obtained in every respect as safe as the best animal oils, and that the admixture of mineral oil with animal or vegetable oils neutralized the acidity in the one case and the acidity and oxidizing tendency in the other, he was of opinion that the safest, most efficient, and most economical lubricants for all manner of bearings are to be found in a judicious mixture of animal, or vegetable, with good mineral oils.

With regard to cylinder lubricants, the peculiar conditions were the liberation of natural acids from vegetable and animal fats by the action of steam and heat, the action of these acids on the liners, and the evidence that in these acids are constituent parts of all animal and vegetable fats and oils; they could not be removed by process of refining. One of the lubricants largely in use was tallow, but that this was the cause of considerable injury to the engine cylinders he had abundant evidence to prove. From a mass of evidence he had collected upon the subject, he was convinced that, if care were exercised in the selection of the oil, and equal care in its preparation and application, hydrocarbon oil would be found thoroughly efficient as a cylinder lubricant, absolutely harmless and much more economical than tallow. Sometimes small percentage of vegetable or animal matter is added, in order to increase the lubricating properties, and in his experience this had always been attended with favorable results.

Hot air engines might be lubricated on the same principle as steam-cylinders, but gasolines presented a new and special feature, as their case the lubricant was not only subject temporarily to the intense heat of the explosion, but also came in direct contact with the flame, and was liable to be carbonized thereby. Therefore, vegetable or animal oils and fats were objectionable in steam cylinders, they were much more so in the cylinders of gas-engines.

TASKS AND BARRELS OF STEEL.—A Wolverhampton, Eng., firm have turned their attention to the manufacture of casks and barrels of steel. The two edges of the sheet steel which form the cask are brazed together in such a manner as to justify the title of "seamless," which the patentees have applied to these productions. The head of the barrel is also riveted to the body, so as to leave no seam, and the ends are shrunk on hot, thus making a very strong end, while, at the same time, the rims are strong enough to give a good purchase to the grapping hooks of hoists and cranes, for loading and unloading purposes. The bush for the tap does not project beyond the rim, so that the nozzle is not liable to be knocked out and injured. The casks are more durable than wood, less heavy and lighter—an eighteen gallon steel cask weighing some ten pounds less—a not unimportant consideration as regards transit. In point of shape, the steel barrel is exactly that of a formed wooden one, the bulge of the belly being of its being easily rolled along, and is managed by one man than drums can be two.

INSULATING WIRE.—A new method of insulating wire for electrical purposes has recently been patented by the Triplex Insulated Wire and Rubber Company. The method consists in tinning wire; it is covered with a layer of soft rubber, around which a strip of soaked linen is wrapped, and which in turn is covered by another layer of thick, hard rubber. For under-layers and wires another layer is added. The product of manufacture of this insulated wire is very simple, all the layers being put on in one operation by means of machinery, thus making it possible to furnish a comparatively cheap cable. The wire is fed from a reel into a groove upon two steel rollers heated with steam, simultaneously two strips of soft rubber, more than covering one-half of the wire, are pressed over the rubber. The coated wire is then automatically wrapped with soaked linen strips, and is carried to a second set of rollers, where two strips of hard rubber are pressed around it to a third coating.

A Reminiscence of Blacksmithing.

A correspondent of the *Blacksmith and Wheelwright* communicates to that journal the following reminiscence of blacksmithing in "ye olden time":

Forty years ago Northern Pennsylvania was almost a wilderness. My ancestors squatted on land from three to five miles apart from each other, and my father was for some time twenty miles away from any other blacksmith. The tools were of a very primitive kind. The bellows was made nearly square, and had a square box on top to hold wind, as they turned it. The drilling machine was a post-hole in the shop and a twelve-foot lever, with one or two of us boys on the other end, while my father, sitting down, did the drilling with a large iron bit and brace.

I have often seen him drill for two hours to do a job that can now be done by one of the new drill presses in fifteen minutes.

When he put on wagon tires he cut the tires in two pieces and then bent them with sledge hammers on a block made for that purpose. After being bent the two tires were riveted together and welded.

To make the tire the right size, it was laid on the wheel and the rim of the wheel was scratched with a "scratch awl." Rivets were put through the felloes at every joint. The screw-plate used then was a piece of steel three eighths thick and one and one-half inches wide, with three holes in it. The bolts had to be made to fit the plate. The first tap used by my father was made with a three square file. In those days bar iron was used for everything. The usual sizes sold by merchants were two inches by one-half, three-fourths or one inch. Horseshoes, small bolts, etc., were forged from this iron.

From September till March, we made shoes and nails until nine o'clock p. m. Now the smith can get shoes, nails, in short, everything, ready made; but forty years ago, it was very different. If my father were to see the tools I use now, he would ask me what they were for.

STEEL, STEAM, GAS AND WATER PIPE.—London *Iron* bears witness to the advantages of steel over iron in the making of pipe. It remarks that the Chameroy company make pipe of steel plate for conveying water under high pressure. The steel plates are coated with lead on both sides by immersion or otherwise, then rolled to form, riveted and soldered the whole length and covered with pitch. The first cost of steel is not much greater than that of iron, and the steel pipes possess considerable advantages over those of iron. The lead coating is superior on account of the fineness of grain in the steel; the resistance to tensile strain and internal pressure is 50 to 60 tons, and the resistance to deformation longitudinally from 30 to 40 times greater, while the superior elasticity of the steel plate permits of the pipes receiving tolerably hard knocks without being permanently deformed. For equal thickness the steel tubes stand twice the internal pressure of the iron, and being both light and strong, they are admirably adapted for laying down temporarily and taking up again.

LARGE GUN-BORING MACHINES.—Two exceptionally large gun-boring machines are now being constructed for the British government by a Manchester firm. The main bed for each machine weighs seventy-six tons; the main driving head-stocks, which are six feet high, with spindle weighing twenty-eight tons each, and the steady rests carrying the guns weigh twelve tons each. The bed for operating the boring bar is fifty-four feet long and weighs sixteen tons, and the total weight of each machine, when complete, will be 180 tons. The machines are constructed to bore six feet six inches diameter and fifty feet long, and the main head-stock is driven by a worm-wheel eight feet in diameter and four inches pitch. Two machines of similar construction were built for the government by the same firm a few years since, but the present ones are by far the largest of their kind yet constructed, and have been ordered to meet the requirements for heavier and more powerful ordnance.

A NOVELTY IN FIRE PROOF STRUCTURE.—A novel departure in the construction of fire-proof structures has been made by Mr. Samuel Liddle, of Hamilton, Nev., for which he has obtained a patent. The invention consists in a building with a hollow shell, and perforated iron posts and beams, which shell is to be filled with water from a reservoir above in case of fire. By an ingenious arrangement, the water is conducted through their hinges into the hollow blinds. After the fire the water may be drawn off into a tank, and pumped back into the reservoir again. This invention is also applicable to the hulls of vessels.

AMERICAN ENGINES IN LONDON.—In a plant they are now erecting over the river Thames, in London, England, they are sending two engines made by the Armington Sins Co., of Providence, R. I., for, after thoroughly experimenting, they could not find an engine made in England, or all Europe, that could do the work as well as the Yankee engine. Another engine is to be placed under the library of the House of Parliament; this was after a visit and a report of a committee, that the engine would run without noise or jar.

SCIENTIFIC PROGRESS.

The Visibility of Ruled Lines.

At a recent meeting of the Boston Scientific Society Prof. W. A. Rogers read a paper on line ruling, from which a few interesting points are worth special notice. The Professor stated that he had ruled band lines, in which the lines were so fine and delicate that they could not be distinguished with a microscope, although their spacing was much within the power of the microscope to resolve. Yet there could be no mistake about the existence of the lines, for several reasons: The pressure of the diamond on the glass was sufficient to produce the cut; while moving over the surface of the glass it produced the peculiar singing sound, which is always indicative of the action of the diamond on glass, and finally the lines became visible when filled with fine graphite.

There is a limit beyond which lines cannot be filled with graphite. That limit is from one eighth to one nine thousandth of an inch.

A most surprising result of some of the experiments of Prof. Rogers is that the naked eye can discern not only single lines, that cannot be seen with a microscope, but that it can also detect errors which the microscope will not show.

Thus, he has a glass upon which lines are distinctly visible to the naked eye, and, although an objective of low power will show them, one of a higher will not.

Again, even errors or imperfections in ruling, which cannot be seen or measured with the microscope, may reveal themselves to the eye by a peculiar waviness of the image.

The Professor attributes the failure of the objective to show the lines, as mentioned above, to the present impossibility of illuminating the lines with light of the exact angle of incidence required, and the proper angle of illumination, he thinks, deserves more careful attention.

THE VOLATILIZATION OF SOLIDS.—In a communication to the Manchester Literary and Philosophical Society, Mr. Henry Wilde deals briefly with the behavior of solids at high temperatures, in relation to the property possessed by these solids of giving off vapor of their own substance. In connection with incandescent electric lamps this phenomenon is made susceptible of easy study. Platinum threads were at first used for these lamps; but it was soon found that an atmosphere of platinum vapor was formed in the interior of the bulb, which, after the lamp had been in action a considerable number of hours, condensed on the surface of the glass, and formed a bright reflecting surface like a mirror. The substitution of a filament of carbon for the platinum in lamps of this order overcame the objection to a great extent; for the vaporization and condensation of the incandescent material, however interesting from a philosophical standpoint, was fraught with much practical inconvenience. Still, when a high degree of incandescence is imparted to the carbon in the modern lamp, an atmosphere of its vapor is formed in the interior of the bulb, which condenses on the glass, forming a dark lustrous surface, and thereby obstructing the light in the same manner as when a filament of platinum was employed. Thus the behavior of the carbon and platinum in such cases clearly shows that the most dense and refractory substances in nature vaporize at high temperatures while still retaining their solid form. Electric lamps were shown by Mr. Wilde, exhibiting the condensed platinum and carbon on the interior surfaces of the glass bulbs.

PUTTING PELAGIC ANIMALS TO SLEEP.—The *American Naturalist* says Dr. Fol, of Geneva, has made the important discovery that eel-eaters and eel-binders may be rendered insensible and kept so for hours and even days, without injury, by saturating the water with carbonic acid. The containing vessel must, of course, be hermetically closed. The animal at once becomes insensible and motionless, but preserves its natural appearance, and recovers at once when again placed in pure sea water. This method may be used not only for obtaining lifelike photographs, but also, as Dr. Fol suggests, for transporting animals alive. Fishes and mollusks do not survive this treatment, and crustaceans for only a short time.

Dr. Fol tried various narcotics, but found that small doses would not bring the animals to rest, while large doses acted as poisons. The same proved true of tobacco smoke and aqueous solutions of ether, chloroform, and ethyl bromide. Sulphuric acid and carbonic oxide gave satisfactory results in only a few cases.

AN INSECT EXHIBITION is to be held in Paris this year, from July 1st, for just three weeks, under the auspices of the Central Society of Agriculture and Insectology. It will include first, useful insects; second, their products, raw, and in the first transformations; third, apparatus and instruments used in the preparation of those products; fourth, injurious insects and the various processes of destroying them; fifth, everything relating to insectology.

MOUNT ETNA is in eruption, pouring out from the central crater a stream of lava. Vesuvius is in its usual passive state, although there is always a subterranean stream of lava flowing. Visitors are conducted by guides to the spot where the liquid fire may be seen through an aperture in the solid crust of lava. The column of smoke constantly ascends, and at intervals at night there is a brilliant light,

West Indian Phosphate.

The works at Mona Island, West Indies, which were started about two years ago, are now well advanced, and with a full productive capacity of from 20,000 to 30,000 tons per year.

The guano is already in high favor in the United States, where it has been thoroughly tested, and is pronounced one of the best, if not the very best, of such materials imported there.

The phosphate rock, of which now considerable is raised, is in active request in England and on the Continent, especially the latter, where the more highly concentrated fertilizers are generally used.

The deposits or accumulations occur on the floors of the immense caves penetrating the coast line of the island—a tertiary coral rock—for ten or twelve miles almost interruptedly.

The thickness of the deposits is usually about four or five feet. The rock phosphate, which is really phosphatized coral rock, is found both as a massive stratum or shell underlying the bed guano, and also incrusting the masses of rock found imbedded in the guano. The deposits are very interesting from a scientific point of view. The crystallized calcite, aragonite, and gypsum are found as pure as if from a primary formation.

Many new combinations of phosphoric acid, giving rise to a new series of phosphatic minerals, are quite abundant. The two examined and described by Professor Sheppard, of New Haven, as monite and monitite are bi-basic and hold the highest combination of phosphoric acid known in any natural phosphate. They occur well crystallized. The Mona guano analyzes fifty-two to sixty-eight per cent bone phosphate on a dry basis, and commercial samples of the rock eighty-seven to eighty-eight per cent bone phosphate. Both are singularly free from iron and alumina. Many Indian relics and remains have been found in and under deposits, viz.: implements, pottery, shells, bones, etc. Some of these most interesting relics are in my possession. The work is under the personal supervision of Mr. J. G. Miller, of Ottawa, a practical scientist. —*American Railroad Journal*.

AN EBONITE THERMOMETER.—A thermometer more sensitive than the mercurial indicator—one that will indicate the thousandth part of a degree centigrade is promised by M. Michelson, who has demonstrated the principle on which his very sensitive instrument is constructed before the French Physical Society. He does not employ mercury or spirits for his thermometer, but something that expands still more in the presence of heat—namely, hardened rubber or ebonite. The instrument is in the form of a spring, which is made of platinum on one side and ebonite on the other, and as the latter dilates some ten times more than the former under heat, there is naturally exerted a rise and fall in force everytime a rise and fall of temperature takes place. The force exerted is communicated to a delicate lever or arm, and this, reflecting a beam of light from a lamp, magnifies the force that has been developed, and renders the change easily readable to the eye. Edison, it may be remembered, employed rubber for a similar purpose. —*Cotton, Wool and Iron*.

PRODUCTION OF SULPHUR IN THE SOIL OF PARIS.—Some recent excavations for public works, in Paris, have opened masses of mixed rubbish in which there is an abundance of native sulphur. Its crystallization can be perceived by the naked eye, and the microscope shows that the crystals are octahedral, with the usual forms of natural crystals, sometimes truncated and combined with right prisms. Danbree attributes the origin of the sulphur to the simultaneous presence of sulphate of lime and organic matters which are associated with it, such as vegetable remains, manure, leather, and fragments of bones. In some places, the quantity of sulphur is sufficient to pay for mining. It consists of a breccia of small fragments, incrustated with crystalline sulphur, which helps to cement them together. Crystallized sulphur is also produced between fibers of decayed wood. When the bed was opened it exhaled a powerful odor, resembling that of phosphorus, which was attributed to phosphuretted hydrogen. —*Comptes Rendus*.

DUST, MIST, AND CLOUDS.—Mr. Aitken draws the following conclusions from an extensive series of experiments: "Whenever vapor condenses in the atmosphere, the condensation is always made on a solid nucleus, which is furnished by particles of dust. Without dust there would be neither mists nor clouds, and the super-saturated air would transform every object upon the earth's surface into a condenser upon which it would deposit its excess of water. Whenever the breath becomes visible in a cold atmosphere it demonstrates the impure and dusty condition of the air. The foam of the sea, meteoric matter, and fires are fertile sources of the dust and impurity." —*Les Mondes*.

BRONZE COLORS can be fixed upon glass or porcelain, according to Professor Boettger, by painting the articles with a concentrated solution of potash water glass of thirty degrees B. and dusting them with the bronze powder. The latter adheres so firmly that it will not be affected by water, and may be polished with steel or agate.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T SALE.	SECRETARY.	PLACE OF BUSINESS.		
Alhambra M Co.	Nevada.	16.	7. May 7.	June 11.	July 2.	F. J. Schwarz.	324 Washington st.
Belle Isle	California.	5.	20. May 16.	June 19.	July 10.	J. W. Pew.	310 Pine st.
Alta S M Co.	Nevada.	12.	25. Apr 10.	May 15.	June 4.	W. H. Watson.	302 Montgomery st.
Best and Belcher M Co.	Nevada.	20.	50. May 8.	June 13.	July 3.	W. Willis.	309 Montgomery st.
Belcher M Co.	Nevada.	32.	25. Apr 21.	May 24.	June 12.	J. Crockett.	327 Pine st.
Belmont M Co.	California.	7.	25. May 1.	June 4.	June 25.	C. C. Harvey.	309 California st.
Bodie T and M Co.	Nevada.	27.	20. May 7.	June 11.	July 5.	J. M. Brazell.	328 Montgomery st.
Fullon M Co.	Nevada.	27.	50. May 17.	June 21.	July 11.	F. B. Latham.	408 California st.
Con Amador	California.	5.	5. Apr 27.	May 31.	June 20.	D. Buck.	309 Montgomery st.
Campo Seco Copper M Co.	California.	11.	50. Mar 27.	Apr 30.	May 21.	W. E. Dean.	309 Montgomery st.
Chollar M Co.	Nevada.	11.	5. May 2.	June 8.	June 27.	W. E. Dean.	309 Montgomery st.
Con Imperial M Co.	Nevada.	19.	10. Apr 20.	May 21.	June 6.	F. M. Elliott.	320 Sansome st.
Cahorena M Co.	Mexico.	7.	30. Mar 12.	Apr 26.	May 21.	E. N. Hall.	327 Pine st.
Day S M Co.	Nevada.	12.	100. May 12.	June 21.	July 16.	P. Jacobus.	309 Montgomery st.
Enrecla Con M Co.	Nevada.	4.	100. Apr 20.	May 26.	June 15.	J. F. Sperling.	300 California st.
Kilco Con M Co.	California.	20.	100. Apr 20.	May 26.	June 16.	F. Schirmer.	785 Folsom st.
Golden Pledge Gravel M Co.	Nevada.	2.	4. May 2.	June 6.	June 25.	F. S. Monroe.	304 Montgomery st.
Hope Con M and M Co.	Nevada.	18.	10. Apr 10.	May 11.	June 4.	H. A. Charles.	419 California st.
Julia Con M Co.	Nevada.	2.	5. Apr 21.	May 24.	June 13.	W. H. Watson.	302 Montgomery st.
Lady Washington M Co.	Nevada.	3.	10. Apr 27.	May 28.	June 18.	H. G. Jones.	327 Pine st.
Loretto M and M Co.	Mexico.	4.	25. Mar 22.	May 2.	May 31.	J. I. Scoville.	309 Montgomery st.
Martin White M Co.	Nevada.	14.	25. Apr 2.	May 7.	May 28.	H. Sayre.	330 Pine st.
Mount Potosi M Co.	Nevada.	9.	20. May 16.	June 12.	July 12.	J. W. Pew.	310 Pine st.
North Belle Isle.	California.	6.	10. Mar 13.	May 10.	May 31.	H. Smith.	307 Montgomery st.
Napoleon M Co.	California.	7.	50. Apr 26.	June 1.	June 21.	C. L. McCoy.	309 Montgomery st.
Ophir M Co.	Nevada.	44.	15. May 7.	June 11.	June 30.	C. E. Elliott.	327 Pine st.
Pleasant Valley M Co.	California.	1.	25. May 17.	June 22.	July 11.	W. E. Dean.	309 Montgomery st.
Potosi M Co.	Nevada.	12.	10. Apr 6.	May 10.	May 31.	H. R. Spiney.	310 Pine st.
Scorpion M Co.	Nevada.	15.	01. Mar 16.	Apr 30.	May 25.	R. N. Van Brunt.	318 Pine st.
Summit M Co.	California.	10.	100. Apr 28.	June 4.	July 22.	C. G. Brooks.	210 Front st.
San Miguel Con M Co.	Mexico.	2.	50. May 2.	June 6.	June 25.	J. M. Buffington.	309 California st.
Union Con M Co.	Nevada.	22.	100. May 16.	June 20.	July 9.	G. C. Pratt.	309 Montgomery st.
Utah S M Co.	Nevada.	44.	25. May 14.	June 15.	July 16.	J. H. Applegate.	320 Sansome st.
Wales Con G and S M Co.	Nevada.	1.					

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Chubbard G M & M Co.	California.	2.	05. Mar 30.	May 2.	June 1.	P. J. Sullivan.	721 Post st.
Lima Con S M Co.	Arizona.	5.	05. Apr 4.	May 15.	Jun 5.	R. D. Hopkins.	438 Montgomery st.
Lucky Hill Con M Co.	Nevada.	2.	10. Apr 2.	May 4.	Jun 4.	H. A. Unrich.	87 Ellis st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Cahorra M Co.	Nevada.	W. I. Elliott.	320 Sansome st.	Annual.	June 11
Caledonia M Co.	Nevada.	W. I. Oliver.	328 Montgomery st.	Annual.	June 5
Crown Point M Co.	Nevada.	J. Newlands.	327 Pine st.	Annual.	June 4
Excelsior Deep Gravel Co.	California.	T. J. Watson.	323 Front st.	Annual.	June 6
Fairplay Con M Co.	California.	T. W. Nowlin.	230 Montgomery st.	Annual.	May 28
Fair Play Con M and M Co.	California.	T. W. Nowlin.	230 Montgomery st.	Annual.	May 28
Morgan M Co.	California.	C. L. Tilden.	806 Market st.	Annual.	May 26
New Coss M Co.	California.	R. Shamwell.	320 Sansome st.	Annual.	June 5
Silver Hill M Co.	Nevada.	W. E. Dean.	309 Montgomery st.	Annual.	May 24
Silver Hill M Co.	Nevada.	W. E. Dean.	309 Montgomery st.	Annual.	May 24

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Bulwer Con M Co.	California.	W. Willis.	309 Montgomery st.	.05.	Apr 12
Concentration Con M Co.	Arizona.	D. C. Bates.	309 Montgomery st.	.25.	May 28
Jackson M Co.	Arizona.	D. C. Bates.	309 Montgomery st.	.10.	Mar 17
Kentuck M Co.	Nevada.	J. W. P. W.	310 Pine st.	.10.	May 18
Navajo M Co.	Nevada.	J. W. P. W.	310 Pine st.	.10.	May 18
Northern Belle M & M Co.	Nevada.	Wm. Willis.	309 Montgomery st.	.50.	Apr 16
Silver King M Co.	Arizona.	J. Nash.	315 California st.	.25.	May 15
Standard Con M Co.	California.	Wm. Willis.	309 Montgomery st.	.25.	May 12

Table of Highest and Lowest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAY 8.	WEEK ENDING MAY 10.	WEEK ENDING MAY 17.	WEEK ENDING MAY 24.
Alpha.	1.35	1.50	1.50	1.70
Alta.	25c	30c	2	35
Andes.	45c	50c	40c	55c
Albion.	1.05	1.20	1.15	1.25
Argenta.	1.05	1.20	1.15	1.25
Atlas.	1.05	1.20	1.15	1.25
Belcher.	90c	1.05	1.15	1.30
Belding.	3.35	3.75	3.70	4.25
Best & Belcher.	60c	65c	75c	80c
Bullion.	60c	65c	75c	80c
Bechtel.	40c	50c	55c	60c
Belle Isle.	1.20	1.40	1.05	1.25
Bodie.	1.00	1.10	1.05	1.15
Benton.	1.00	1.10	1.05	1.15
Bodie Tunnel.	1.00	1.10	1.05	1.15
Caledonia.	1.00	1.10	1.05	1.15
California.	1.00	1.10	1.05	1.15
Challenge.	1.00	1.10	1.05	1.15
Chollar.	1.00	1.10	1.05	1.15
Confidence.	1.00	1.10	1.05	1.15
Con Imperial.	1.00	1.10	1.05	1.15
Con Virginia.	1.00	1.10	1.05	1.15
Crown Point.	1.00	1.10	1.05	1.15
Day.	1.00	1.10	1.05	1.15
Elko Con.	1.00	1.10	1.05	1.15
E. M. Diablo.	1.00	1.10	1.05	1.15
Eureka Con.	1.00	1.10	1.05	1.15
Eureka Tunnel.	1.00	1.10	1.05	1.15
Excelsior.	1.00	1.10	1.05	1.15
Grand Prize.	1.00	1.10	1.05	1.15
Gould & Curry.	1.00	1.10	1.05	1.15
Hale & Norcross.	1.00	1.10	1.05	1.15
Holmes.	1.00	1.10	1.05	1.15
Independence.	1.00	1.10	1.05	1.15
Julia.	1.00	1.10	1.05	1.15
Justice.	1.00	1.10	1.05	1.15
Kentuck.	1.00	1.10	1.05	1.15
Martin White.	1.00	1.10	1.05	1.15
Mono.	1.00	1.10	1.05	1.15
Mexican.	1.00	1.10	1.05	1.15
Mt. Diablo.	1.00	1.10	1.05	1.15
Mt. Potosi.	1.00	1.10	1.05	1.15
Noonday.	1.00	1.10	1.05	1.15
Northern Belle.	1.00	1.10	1.05	1.15
North Noonday.	1.00	1.10	1.05	1.15
Navajo.	1.00	1.10	1.05	1.15
North Belle Isle.	1.00	1.10	1.05	1.15
Oberlin.	1.00	1.10	1.05	1.15
Oreana.	1.00	1.10	1.05	1.15
Oro.	1.00	1.10	1.05	1.15
Potosi.	1.00	1.10	1.05	1.15
Pinal.	1.00	1.10	1.05	1.15
Savage.	1.00	1.10	1.05	1.15
Sag Belcher.	1.00	1.10	1.05	1.15
Sierra Nevada.	1.00	1.10	1.05	1.15
Silver Hill.	1.00	1.10	1.05	1.15
Silver King.	1.00	1.10	1.05	1.15
Scorpion.	1.00	1.10	1.05	1.15
South Nevada.	1.00	1.10	1.05	1.15
Syndicate.	1.00	1.10	1.05	1.15
Tuscarora.	1.00	1.10	1.05	1.15
Union Con.	1.00	1.10	1.05	1.15
Utah.	1.00	1.10	1.05	1.15
Ward.	1.00	1.10	1.05	1.15
Wales.	1.00	1.10	1.05	1.15
Yellow Jacket.	1.00	1.10	1.05	1.15

WORK on the Northern Pacific Railroad bridge across the Willamette was commenced by driving piles. It is publicly stated that parties owning dock property above the site of the bridge will immediately begin an injunction suit. The bridge will be built in conformity with the views of United States engineers, and the draw spans will be 175 feet in clear.

THE revenue cutter, *Thomas Corwin*, that since her return from her famous cruise, the middle of last November, has been lying in this port, is about to leave for the Arctic on her regular six months' cruise.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alpine.

RICH STRIKE IN THE POLARIS.—Monitor *Argus*, May 18: A very favorable strike was made last Tuesday in what is known as the Polaris location, virtually a continuation or location between the Stella and Colorado No. 2 mines. T. N. Hansen, one of the owners, brought into town the same day some samples of ore and had an assay, which showed \$86.73 silver per ton, with a trace of gold. He reports that this find was made within a distance of fifteen feet from the surface, and the entire length of the tunnel does not exceed twelve feet, and reports that an ore body has been encountered that had every indication of proving permanent and rich. We congratulate Messrs. T. N. Hansen and D. R. Hawkins, the owners of this claim, on striking such good ore so near the surface.

Amador.

VOLCANIC MINING ITEMS.—Amador *Dispatch*, May 16: A very promising gold quartz mine has been recently developed by Mr. Canvin near Volcano. Mr. Hadler, near the old Markley, sank a shaft 100 ft. deep on a vein that in earlier days yielded excellent results. All the new ground in lower portion of shaft, shows high grade ore some two feet broad. The owner is seeking for assistance to plant larger machinery than heretofore used, for the purpose of sinking 100 ft. deeper. The twenty stamps of the Downs mill are now running steadily. The stopes between the 400 ft. and 500 ft. levels are supplying the mill with ore of apparently inexhaustible qualities. Productive as usual. It is reported that a gravel mine near North fork, on the Mokelumne river, was sold a few days ago to San Francisco parties. Work in the deepest shaft (320 ft.) of the Aene mine, some three miles above Volcano, was stopped last Thursday. Since last November the mine has been under the satisfactory management of Mr. Stetson, an old quartz miner identified with the mining interests of Calaveras and Amador for years. The heavy flow of water encountered in the 300 ft. level, is stated to be the principal cause of deferring operations there for the present. The Company paid all demands promptly and continues working a few men near the surface. Mr. Muck is developing large quantities of ore on the former Sorocco mine. The Volcano Tunnel Co. are now realizing expectations of dividends, under the prosperous supervision of Supt. Doolittle, a practical hydraulic miner. Although the grade of the large flume in tunnel is sufficient and the requisite supply of water has been very limited, a large space of ground has been swept off to the flume grade. The clean-up will be large. The gravel remaining below the flume grade is all new, rich, and estimated to be from twenty to fifty feet in depth. It is intended to hoist this gravel into the flume during the summer, sufficient water being in command then for that purpose.

LAMING GRAVEL CLAIM.—Amador *Ledger*, May 16: A large force of men are employed upon this gravel mine, situated in the neighborhood of Irish hill, in lone valley, consisting of 15 white men, and a lot of Chinamen, the latter under the direction of Hugh Clark, formerly underground foreman of the lone coal mine. The pay dirt is very rich, as much as \$7.50 to the pan has been taken out. The gravel is from four to six feet thick, the richest portion resting on the bedrock. This gravel, however, lies under from 20 to 25 ft. of top-dirt which has to be serped off before the gold can be got at. One pit, about 25 ft. square, has been worked out, and yielded \$1900. Another pit is now almost ready to commence mining out. Although so very rich the enormous expense involved in removing the top-dirt renders it problematical whether it can be worked profitably. The nature of the ground—a sort of quicksand in places—makes it hazardous to attempt extracting the pay-dirt by drifting.

MANMOTH.—There is little going on at this mine. The mill is still idle. Only two men are employed stopping rock. The tunnel is being pushed ahead as vigorously as possible. It is doubtful whether the mill will be started again until existing litigation has been settled. The wet weather of the past week has made it impracticable to haul ore even the short distance from the mine to the mill.

MISCELLANEOUS.—The Kelly mine is at a standstill, the boggy state of the roads making it impossible to haul ore from the Morgan mine.

SUTTER CREEK.—Developments at the Mahoney are looking favorable. A force of men have been working at the 900 level for three weeks past. A crosscut at this depth has been run west, and in the last few days a change has taken place in the nature of the ground. Gangue and slate has put in an appearance, which is considered a good indication. Some quartz has been met with, which prospects fairly. At the mill 20 stamps are kept running steadily on rock from the open cut near the mill, and seems to be paying. Twenty stamps of the Amador Consolidated are kept going on ore taken from an open cut on the property. The quartz now being taken out is of better quality than at anytime before.

Calaveras.

STARTED AGAIN.—Calaveras *Chronicle*, May 17: The Empire mine, in Old Woman's gulch, started up again this week. We are informed that the mine, which is worked through an incline tunnel something like 600 ft. in length, has been cleared of the water, and active operations commenced. The mill was started and everything runs smoothly and satisfactorily.

ROBBERED.—Some thieves recently robbed the sluice boxes in the claim of W. V. Clark, near Railroad flat. The five first boxes were cleaned up and contents appropriated by the wretches. A night watchman had been employed to guard the claim against the thieves for some time, but on the night in question there was no guard, a fact upon which the thieves seemed to be well posted. Mr. Clark was exceedingly unfortunate thus to lose the fruits of a whole season's run. From what was left by the thieves, together with what was cleaned up in the daytime previous to the robbery, Mr. Clark realized about 50 cents a day for his labor during the season.

MURPHYS.—Calaveras *Citizen*, May 17: Business is booming now in the vicinity of Murphys. Know-

lton, Dodge and Sublet are putting up a Kei quartz mill on the O. K. and Buckhorn mines, near the Sperry spring, of five tons daily capacity. Stephen Kendall is the millwright. The Fair has paid off, and Tom Goodwin, the superintendent of the Calaveras mine, is stirring up the boys. Oro Plata is running night and day with a force of men and taking out good pay.

El Dorado.

THE DELMARCA MINE.—Mt. Democrat, May 18: This mine has developed into one of the most promising quartz mines in the county. It is located about one mile and a half northeast of Kelsey, one of the large reservoirs of the California Water and Mining Co. One of the shafts, at a depth of 90 ft., developed a ledge six ft. wide that averages 90 ft. in consequence of a surplus of water shaft was abandoned, and another was started at a distance to the southeastward, which "paid for ground down." This was on a supposed "see but it gradually developed with depth into a four ledge, bearing rich sulphurets in vast quantities 90-pound lot of the ore was worked, and yielded 30c at the rate of about \$180 per ton. A roasting mill and substantial hoisting works are to be erected during the summer, when work will be vigorously prosecuted. The present owners, Messrs. McG Kelley, are residents of Kelsey.

PEKIN MINING DISTRICT.—A largely-attended meeting of miners was held at the residence of J. son and son, China Hill, Mud Springs township (Wednesday May 10th, for the purpose of electing new Recorder for Pekin Mining district, the former Recorder having removed from the district, in view of a great number of new discoveries have recently made, and in which there has been a great revival of the mining industry. By unanimous choice the vacant office was conferred upon J. W. John, who with his father has been among the most successful miners of the district, and largely instrumental in developing its capabilities and attracting attention to it. The most notable feature of this district is its great "greenstone belt," along which are now a score or more of richly paying mining enterprises in course of vigorous prosecution and development. There is every indication that this district will warmly contest with Grizzly Flat for distinction of being recognized as the best mining camp in El Dorado county, and Grizzly will have look sharply to her laurels.

Mariposa.

DILTZ MINE.—Mariposa *Gazette*, May 18: The return of Captain Diltz from the East, work on this mine has been resumed by a force of men, they are blasting away a heavy bank of ledge lined with strata of quartz, which is piled for mining purposes, and the dirt run out on a car washed through the sluices. The mine at this point looks exceedingly well, and the further prospect of the work will no doubt soon develop a rich deposit of gold—particularly characteristic of this mines besides a large quantity of good milling ore, will be preserved for future operations. The old tunnel has fallen in, and cannot be made available for use at present. Captain Diltz recently visited Whitlock mines, and found them almost inaccessible to reach, caused by the overgrowth of chaparral and chinquapin. The Captain immediately employed men to clear away the thicket of brush, making mines accessible to visitors. The Spencer shows a vein from three to nine feet thick and good looking ore. The Whitlock shows a vein six feet in thickness, at a point where the ore runs 20 to 25 tons when last worked. There are also places on this vein which look remarkably good. The Schroeder mine is said to be making good of the water from the upper ditch supplied by late rains. Large quantities of surface dirt is washed away from the mine and vein.

Mono.

GORILLA.—Homer *Index*, May 19: Working is pushed in all three of the adits penetrating the Gorilla lode, and the ore bodies are everywhere strong and of good quality. Recently work commenced on three seams of ore crossing the lode at right angles, and a few feet into the hill these seams came together, forming a foot solid vein of high-grade ore.

ILLINOIS.—Callahan and Isbell are opening one of the most promising properties in this part of the county, on the mountain side overlooking western shore of Mono Lake.

MAY LUNDY.—This mine is making regular very heavy shipments of bullion, though we are yet at liberty to give the figures. The mine is in excellent condition and is turning out some very fine ore, in the extraction of which about sixty men are employed underground. The road is improving, everything about the mill is running smoothly.

IN BRIEF.—The Virginia Creek Hydraulic Mining Company, operating on a large gravel field adjacent to the Old Mono diggings, is now employing a large force of men, and meeting with every encouragement. The Mono Lake Hydraulic Mining Company is working the usual force, though the extreme cold weather has somewhat retarded the progress of late. McKinnon and McDonald are opening their Ohio mine, near Mt. Gibbs, and struck rich silver ore equal to that of the Ella Bay. Considerable prospecting is being carried on in the south end of Tioga district, and with the most encouraging results. The Grizzly mine, above Mono Lake, is still improving in appearance as the tunnel progresses. Work is soon to be commenced on several mining locations near the head of Mill Creek canyon. Jordan district and the Mono diggings are beginning to show considerable life.

Nevada.

NOTES.—Nevada *Transcript*, May 19: The Banner Con Tunnel Co. (Ternan & Co.), at the hill, a short distance from this city, will in a few days have its 10-stamp quartz mill running. But people have any idea of the amount of prospect that is going on within a mile or two from the city. Go in any direction, and prospectors will be found doing all kinds of work in developing lodes. There is one vast net-work of valuable ledges in the vicinity, and it would seem, judging from the new enterprises that are being started, that the newness men are just beginning to find it out. A few years ago if any one, except a capitalist, commenced operations on such a thing as a quartz ledge, his credit went down par with a rush, and every state of affairs has all subsided now, and every one can afford it is taking an interest in quartz.

in this neighborhood, and the entire price spent in this city. That is one reason why this city is so prosperous, and its quartz interest is up so finely.

Plumas.

QUONSI HILL.—*Plumas National*, May 12: It is on good authority that the tunnel at Quonisi is now in good pay gravel, and is found right for the bedrock. The "pay-grit" is three feet deep, a beautiful dark blue gravel, gold in good paying prospects. No flume is to be had there at present, and the prospect is to be done with the old-fashioned "dredge" but that slow-going method will give a fair what the gravel is worth, and the necessary payments will be made as soon as possible. The quartz of Quonisi hill is pretty well assured, and no doubt but that in a year or two from this will rival the far-famed Bald Mountain, of Butte.

OLDWOODS.—Mr. Parsons has the machinery at the Deadwood found and has the tunnel up. The shaft is found to be in good ground, the timbers being solid. A few days more will be required to get everything to run and then we shall expect to hear of some results.

QUARTZ.—Mr. Geo. Lee brought in some specimens from the Piazoumi mine, near Dutch Lake. The quartz shows free gold in abundance, ranging from four to 15 ft wide, all promising. It is pretty well opened and developed, one being run on it which is 500 ft long. The Piazoumi mine, has expended several thousands in opening it up, and now finds himself helped to put up machinery. This is a good omen for a capitalist.

GREENVILLE MOUNTAIN.—*Greenville Bulletin*, May 17: The ledge was struck the tunnel was continued 40 ft beyond it in order to make certain of the ore body sought, and not a mere prospect.

The result having been found satisfactory, has then started along on the hanging wall of this, is now in about 130 ft. Where the ledge was struck, it was found of the same width as the old workings, 400 ft above; as the ore did not prospect worth much, this reason the drift was continued alongside of the ledge; the latter being soft and required heavy timbering all the way, the hanging wall the ground is solid and no timber is needed. At short intervals apart as the ledge is cut into and the ore found; a very confident assurance that a body of ore will be cut into about 200 ft ahead of the face of the drift. Should any good ore be in the main time, of course it will be got by back when the ledge shall be opened for.

The present condition and future prospects of Greenville Mountain mine are now very encouraging all who have interests in the district.

DEPT. MINE.—The work of putting down the greater depth has been hindered during the weeks by continuance of rainy weather; in addition additional pumping facilities have been the shaft is again clear of water, and sinking resumed. Up to this time but eight have been kept running. Mr. Davis says about of the present week he will drop eight more time to run to till it shall be seen what future results may be made in the mine; his confidence greater than ever that the future will far surpass anything yet seen in the Greenville.

Shasta.

MINE.—*Shasta Courier*, May 10: The mine above the Tower House, in French Creek, is a fine paying property. Inside of Mr. Shaffer has cleaned up over \$30,000 quartz crushed in a small amara. The work of opening the mine, is not near complete but the ore grows better as the work progresses, and it is noted that there is already fully as much ore as has been crushed. If expectations are realized the mine will be tapped soon by tunnel that will be mine to be not only one of the extraordinary richness but of mammoth extent. Shaffer was in the hotel business and pitched in to at mine in earnest, and we heard a mining man remark a few weeks ago that "if the owner government patent for the mine he would get for it that would make his eyes stick out."

NEVADA.

Washoe District.

ELK CON.—*Enterprise*, May 16:—The joint Nevada mine on the 2900 level is down about it will eventually be sunk to the 3000 level to with the drift now going north in the Mexican ledge. Some ore is being taken out from drift No. 2 on the 2900 level, but they are near of the deposit in that direction.

ELK CON.—North drift No. 2 on the 2900 level has now reached the terminus of the ore in section.

ELK CON.—The work for the connection of the winze down from the 2400 level is progressing well. A new winze has been started near of the south drift, which will follow the ore. It will go down at an angle of about 55 degrees.

ELK CON.—Not much work has been done on the 2900 level, but the material in the drifts is very little change.

LOW JACKET.—The mine is looking well and well. Not only is there being found much ore in the old stopes, but also considerable amount that is productive is being opened.

ELK CON.—The northwest drift on the 2400 level is being advanced in ground that is hard. The diamond drill shows that this characteristic will continue for a considerable distance.

ELK CON.—The C and C winze is making progress. Drain boxes are being put in on the 2900 level, and on the 2900 level the usual proceeding made in the main south drift.

ELK CON.—The old Central tunnel is being repaired and is also being made to the ladders in the mine. Some ore is still being extracted from the drifts.

ELK CON.—In crosscut No. 3 on the 2600 level progress has been made during the week in

quartz of a good appearance, though not carrying much metal.

AXMINSTER.—Some fair ore is being extracted from the west drift. In other directions there are favorable indications.

CROWN POINT.—The usual amount of ore is being extracted and sent to the mills.

Columbus District.

NORTHERN BELLE.—*True Exposure*, May 19: A large amount of prospecting is being done, and it is being pushed ahead as speedily as possible. The stopes from the fourth shaft level look promising and continue their usual yield of ore. The ore has improved somewhat, both in extent and quality, above the first shaft level. The section of the mine above the adit level looks about the same as at the date of the last report. Some very good ore is being extracted from the seventh level, the outlook at that point being quite promising. One of a very fair grade is being encountered in the stopes at the eastern end of the ninth level. It improves in appearance as the work progresses. The daily output of ore has been about 65 tons, which is sent to the mill. Both of the mills are running as usual, and doing good work. The bullion shipments amounted to \$13,831.58 for the week ending May 17th, and aggregate \$27,413.80 on May account to the same date.

MOUNT DIABLO.—The stopes from winze No. 2 shows two feet of 505 ore. The ledge below this stopes is about 10 inches wide, and gives assays of ore worth \$60 per ton. The stopes above the third level, near the head of winze No. 2, is showing a foot of 570 ore. The stopes near winze No. 4 is yielding a small amount of \$100 chloride, while the intermediate stopes above winze No. 1, between the second and third levels, is giving a little \$150 ore from a narrow ledge. The east intermediate, between the first and second levels, is turning out considerable 570 ore. The stopes from the west drift from the Callison winze shows some two feet of 570 ore, the formation in the extreme western end of the stopes shows improvement as the work progresses. A little ore of a good grade is being stoped from a point near the shaft on the first level. A bullion shipment amounting to \$5,676.51 was made on the 10th instant, and another of \$7,550.58 on the 14th.

Eureka District.

EUREKA TUNNEL.—*Eureka Sentinel*, May 16: There are fifty-two men on the pay roll at the Eureka Tunnel, of whom only eight are working on ore, the remaining forty-four being engaged in dead work. Still the mine is paying expenses right along and laying aside a surplus every week for the reduction of the company's debt. Within the next week or ten days, the mass of dead work now being done, handling ore seven or eight times, and all that, will be over with. The cribbing in the new shaft, which is now down to the depth required to relieve the first level, was finished last night. Work on the station will be commenced to-day and pushed forward as rapidly as possible. After that the apparatus will be put in for working the cage without delay. The building up of ore by steam, will mark an important era in the history of the Eureka Tunnel. The output of ore will be greatly enlarged at once, and running expenses greatly curtailed. The shaft will be sunk deeper continuously to connect with the workings on the second level. The ambition of Gen. Connor is to have all ore come up as soon as practicable by steam through the new shaft. When this is realized, if developments keep pace with the outlook at several points, the tunnel will cease to be called a "small mine" and will have to be classed among the mines called big. The Addison chamber, in which the principal mining is being done at present, looks better from day to day and improves always the deeper it is explored.

Garfield District.

WESTERN.—*Virginia Enterprise*, May 18: The Western mine, at Garfield, is shipping ore to the Northern Belle mill at Belleville. During the last month 123 tons were shipped there, yielding \$226 per ton, and 15 tons were shipped to San Francisco that yielded \$602 per ton.

Mount Cory District.

MILL AND FURNACE.—*Hawthorne Bulletin*, May 18: Constructing engineers, who will immediately begin the work of surveying and grading the mill and furnace for the Mount Cory M. Co., are expected here in a few days. The plans and specifications are nearly finished, and the engineers will leave San Francisco as soon as all are completed. It is authoritatively stated that the capacity of the mill will not be less than 20 stamps. The location has not yet been decided upon.

Pinto District.

ORE.—*Eureka Sentinel*, May 18: Some high-grade ore is coming out of the Queen mine. This property is a constant ore producer. Messrs. Berryman Bros. are still taking ore out of the Silver Nugget mine, Silverado mountain. Several new locations of mining claims have been made lately in Pinto mining district, which is fast coming into favor with prospectors. The old Champion mine, on Alhambra hill, has been twice relocated, and will be worked by O. H. Smith and Richard Berryman. A tunnel will be started and run on the contact of the limestone and trachyte, from which a crosscut will be driven in under the old workings upon the ledge. There is some good ore in sight.

Secret Canyon District.

MONITOR.—The main tunnel of the Monitor mine is in 100 ft. The indications are very good at the face, but it will be carried forward 150 ft further, from which point an upraise will be made to connect with a shaft sunk to a depth of 12 ft upon the ledge. The ore from this mine is of excellent quality, and the ledge is strong and appears permanent. There is considerable quartz ore, containing black metal and bright chloride of silver, coming out of the Metaline mine, Secret Canyon district. The ore is taken from a seam which makes between limestone and trachyte. There are veins of almost pure magnesite in the mine, which, when broken into lumps, can be used as chalk, making a clear, white mark.

Tuscarora District.

ELKO CON.—*Times-Review*, May 17: During the past week drift No. 3 has been advanced a distance of five feet; total length, 100 ft. Owing to foul air have been obliged to discontinue operations in this drift. The ledge is in fine quality of quartz. Drift No. 4 has been extended a distance of 15 ft; total length, 157 ft. During the past few feet the ledge has produced quartz containing large quantities of sulphurets. During the next week expect to make

connection with shaft No. 1, which will give a sufficient supply of good air for all purposes. As soon as connection is made work will be resumed at all points of the mine.

NORTH BELLE ISLE.—Winze from the 150 level has been opened up and is being put in shape to resume sinking, and will be connected with the 300 level. Present depth, 40 ft.

ARGENTA.—No. 2 upraise above 700 level is up 43 ft. East drift from winze in 23 ft. The ore now being stoped is good and the stopes are looking well. The mill will be ready to start up on the 24th inst.

ARIZONA.

NOTES.—*Prescott Courier*, May 15: The best news we have to relate, this morning, is that large hoisting works, an air compressor and other machinery, for the Peck mine, will arrive shortly. Sinking below the first water level will then commence. L. D. Hardy, one of the best mill men on the Pacific Coast, is at the mine. We heard that the 11 tons of selected ore from the Occident mine (property of the Peck Co.), worked about \$1,800 per ton in San Francisco. All who have examined the Howell Co's Belle mine pronounce it a fine property. It is producing immense quantities of ore. Miners say that Hatz & Majia have a very rich mine in Hassiyampa creek. Slabs of the ore seen by us in this town were rich. The Dosoris and Silver Belt mines continue to produce abundance of rich silver ore. Mine owners who have plenty of rich rock are hoping that some man or company will come in and start other reduction works.

MINING IN YUMA COUNTY.—*Arizona Sentinel*, May 19: Five mines in the Hacuar mountains in this county, have been sold for \$100,000. The mines are about nine miles north of Chien's wells, and seven miles west of old Campo Seco. The ores are copper, carrying gold and silver. Copper mining in Yuma county has never been thoroughly tried, and from the character and quantity of the ores of this district, it will surely prove a success. The Hacuar country will greatly help the trade of the northern portion of Yuma county, and will in a few months make heavy shipments of copper bullion. The copper industry will have another impetus through the development of promising claims near William's Fork, owned by prominent citizens of Los Angeles. There is also considerable activity in the mines around Plomosa, by which summing up, the opening of the Hacuar country, William's Fork and Plomosa, will soon cause the streets of Ehrenberg to bustle with life and activity. Farther south, Silver district is flourishing with a magnificent 40-ton smelter and a quartz mill in active and successful operation, both producing silver bullion in paying quantities. Castle Dome is looking up, and so are the splendid mines in the Mohawk mountains. The ores from the latter place are of a promising character of quartz carrying gold and silver in both a chloride and sulphuretted form. A general resume of the mining outlook of this county can be stated in a few words: That to-day the mines of this county show as good prospects as any in the Territory, and that the majority of the mining prospects now being worked are paying their owners handsome and solid profits.

COLORADO.

ATLANTIC DISTRICT.—*Colorado Miner*, May 12: Our reporter paid a visit to the mines of Atlantic district this week. The Empire and Middle Park wagon road was found free from snow and in good condition for wagons up to a point on the big bend where the trail leaves the road. The first property visited was the Edith Belle lode, discovered in 1881 by S. H. Bennett and Mr. Stanton. This mine has lain quiet for some time though it is intended to prosecute work diligently the coming season. It is located on Russell mountain about a quarter of a mile from the Middle Park road, and is reached by a trail of slight grade, which could be converted to a good wagon road at comparatively slight expense. A good frame house, capable of accommodating 12 men, has been erected, together with a log shaft-house and blacksmith shop. The developments consist of a discovery shaft 20 ft deep, a crosscut 25 ft in length, and several open cuts. A cut was run this spring which has just entered cover, exposing a vein of quartz of two to six inches in width, carrying finely disseminated mineral, specimens assaying from \$329 to \$436 per ton and carrying one ounce in gold. Some of the specimens, which showed no mineral, after being placed in the furnace were covered with buttons of silver "roasted" out.

A. AND P. TUNNEL.—The tunnel is now in 1450 ft and going a head from two to three ft a day. The rock for 100 ft has been unusually hard. Before that a spur was driven on some 200 ft, which, however, circled in and out of the line of the tunnel like a wave. It contained soft gangue and some mineral that ran as high as 47 ounces silver. Fifteen men are employed, and the heading is supposed to be within 50 to 60 ft of the Diamond Joe. The Potosi lode was struck some 500 ft in. Upon this Messrs. Snow and Riggs have drifted under lease 175 ft westerly, having a depth at the breast of over 600 ft. The crevice has specks of mineral and looks more promising than heretofore.

IDAHO.

VIENNA NEWS.—*Ketchum Keystone*, May 14: Reliable persons from the upper country inform us that operations in Vienna will assume a lively shape at an early date. The immense quartz mill of the Vienna Co. is standing ready for a long run with huge amounts of ore from the Mountain King, Solace and Vienna mines. The only thing now causing delay is the snow, which, owing to the cold weather experienced in April, has been a month later in melting than was experienced in March. Capt. Henry Guyer, who, it will be remembered, was engaged to run the Vienna Co.'s works just as soon as the season would permit, in '83, is on his way to Vienna, and other signs of opening operations begin to show as snow leaves the Sawtooth divide.

MONTANA.

THE GRANITE MOUNTAIN.—*Inter-Mountain*, May 14: The Granite Mountain mine, in the Phillipsburg district, now ranks as one of the richest silver mines in the Territory. The vein is rich, regular and permanent, and the ore dump is rapidly assuming mammoth proportions. It is the intention of the company, in the near future, to erect

a mill, but in the meantime a considerable amount of No. 1 ore will be shipped to St. Louis for reduction. A contract has just been signed for the transportation of 1,000 tons of \$500 rock to the railroad, and it is now being sacked for shipment. One of the owners of the property was approached this morning by a reporter and asked why he did not have the ore milled in Butte, and the reply was that it is cheaper to ship it to St. Louis. It could be very easily milled in Butte, as it is an ordinary sulphuret ore containing some ruby and antimonial silver. The Butte mills, however, have all the home ore they can work, and it is for this reason, perhaps, that arrangements for the treatment here of the Granite Mountain product could not be made.

IMPROVEMENTS AT THE SMELTER.—*Butte Miner*, May 16: Under the energetic management of Supt. W. J. King the Bell works are rapidly getting into shape for the extensive operations, which will be commenced whenever the new shaft is connected with the old workings and ore can be hoisted in sufficient quantity to supply both blasts at the smelter. Among other important improvements which will greatly facilitate the handling of ore, is a tramway running under the calcining furnace, connecting with an elevator and elevated tramway, by which the cars can be filled with ore from the furnaces and transported direct to the blast feeds. The calcining furnaces have been doing some extraordinary work during the past week, each furnace averaging 10½ tons of ore per day, which was calcined down to less than five per cent sulphur. Twenty-one tons of ore is run through the single blast each day, which produces a daily matte output of about 10 tons. At the mine, work on the new three-compartment shaft is steadily progressing. The work of putting in the station set at the 270 was finished last Friday, and crosscutting to the old workings may now be commenced at any time, but the intention is to drive work on the shaft as rapidly as possible to the 400 and crosscut to a point beneath the old workings, with which connection will be made by an upraise. It is expected that this connection will be made within the next 30 days, when stoping will be commenced on the high-grade west vein, and from 40 to 60 tons per day hoisted to supply both blasts of the smelter, the output of which will then be increased to from 20 to 30 tons of matte per day.

NEW MEXICO.

THE CARLISLE MINE.—*New Southwest*, May 14: A gentleman just in from the Carlisle mine at Steele Rock, informs us the Carlisle Co. is still working away with a large force of men. The principal working is in the 6x8 ft shaft. The company intend sinking this shaft to a depth of 340 ft before running the level. It is down already quite a distance. He says they were preparing to start up 15 stamps of the mill as he left. He also informed us that the mine will, in all probability, develop into one of the greatest mines on the continent. The ore bodies on the surface, and exposed by the working is simply enormous. It is a sulphuret ore and when down to water level it becomes base, but the machinery of the company under the skillful management of Wm. Farish the superintendent, is such, and has been so constructed that the treatment of it is provided for. It seems to be the opinion of every mining man who has seen this property, that there is nothing anywhere that exceeds it. The croppings are immense, and the vein is as well defined as the hills through which it passes. The Star of the West adjoining this claim on the west, the Center and Pennsylvania adjoining it on the east and all on the same lode, promise to develop into big mines also. The latter claims are owned by different parties. But as yet little work has been done on them. These mines are in Grant county and in the Steele Rock mining district. There are a great many fine prospects out there. Indeed we know of no mining camp anywhere in any county that has a more encouraging outlook than this district. It is beautifully located, only 15 miles from Richmond and the Gila river, close to the line of the Lordsburg and Clifton railroad, and an excellent wagon road to the camp. The district yields gold, silver and copper. The Carlisle mine is a gold mine. There was great excitement there when the discoveries were first made, but after the present company commenced operations the noise quieted down.

OREGON.

NOTES.—*Jacksonville Times*, May 18: The rains are keeping up what water supply there is. F. M. Blevins, of Siskiyou county, is in this section on a prospecting tour. Rich rock is being taken out of the old John Roten ledge on Kane creek. T. B. Hueston, of Thompson creek says the miners of that region still have plenty of water. The miners have made no extraordinary reports as yet.

UTAH.

A REVIEW.—*Tribune*, May 19: The movement of bullion for the week has been the smallest of any week this year, the receipts in this city for the week ending May 17th, inclusive, being \$87,613.46, as against \$132,451.12 the previous week, and \$173,724.51 the week before that. The shipments for the week ending May 12th, inclusive, were: 41 cars bullion, 1,045,894 lbs; 5 cars ore, 114,928 lbs; 1 car ore, 32,600 lbs; total, 47 cars, 1,193,422 lbs. The Horn Silver shipments of bullion were 14 cars, of the value of \$42,000; previously reported for the present calendar year, \$1,267,500; aggregate at this date, \$1,309,500. The quarterly dividend of \$300,000 was duly paid on time, May 15th. The week has been eminently one of preparation, and the signs of the resumption of summer's activity are on every hand. The opening of the Alta railway, the bettering of the canyon roads, and the departure of mining men hither and thither, all tend to the same purpose. The Crescent bonanza diminishes no what in interest. It sent in during the week 200 of ore (not counted in above receipts) that were sold here at satisfactory figures. A dividend of 10 cents per share, amounting to \$50,000, has been declared by the Crescent, payable June 20th. This company also advertises for proposals for hauling ore from its dumps for a year, on the basis of 60 tons per day, from which it will be seen that the intention of the management is business. The Sampson is also moving; there was received from it on the 12th (aside from the report of receipts above given) three cars of second-class ore, which netted the company a little short of \$40 per ton.

Santa Cruz Mountains.

We give herewith a sketch of the crowning height of the Santa Cruz mountains, Mt. Bache, or, as it is locally called, Loma Prieta, which is the name applied by the Spanish-Mexican population to any chaparral covered mountains which look black in the distance.

The entire system of elevations between the Bay of Monterey and the Golden Gate is sometimes included under one name, and called the Santa Cruz range, which is, however, properly the term for the southern and middle portions of the hills in question, or those included in Santa Cruz county. Here, in fact, are the highest mountains and the broadest belt of elevated country; the chain diminishing in height and breadth as it runs north, until it finally sinks beneath the ocean at the Golden Gate. The entire range, from the Bay of Monterey to the end of the peninsula, is about sixty-five miles in length, and its greatest breadth is about twenty-five miles. The eastern ridges are highly metaphoric, and constitute the main portion or backbone of the range, Mount Bache be-

for about forty miles. The northerly portion of this metamorphic ridge lies back of Mountain View, and of it Black Mountain is the culminating point, being about 3,000 feet high. Here are several parallel ridges which run out into the plain to the southeast, their strike taking them to the north of Mount Bache, the range being broken and irregular in the intermediate region, where cut through by the Los Gatos and Quito creeks. All these ridges have steep slopes, and are very dry in the summer and covered on their northeastern sides with dense chaparral, composed more exclusively of the *Adenostoma fasciculata*, or "chamisa," than were similar tracts farther south, where various species of *ceanothus* predominate in the dense, thorny and almost impenetrable growth, to which the name of "chaparral" is universally given.

The slopes on the southwest sides of the mountains were less inhospitable, being covered to a considerable extent with wild oats, as were also the foothills. The foothills in this region extend several miles into the San Jose plains, and are covered with a fertile soil; they form

Mineral Prospects near the Colorado.

The *Calico Print* says: Reports are constantly coming in from points along the railroad, between here and the Colorado river, in regard to the country which is now being prospected for mineral by numerous parties.

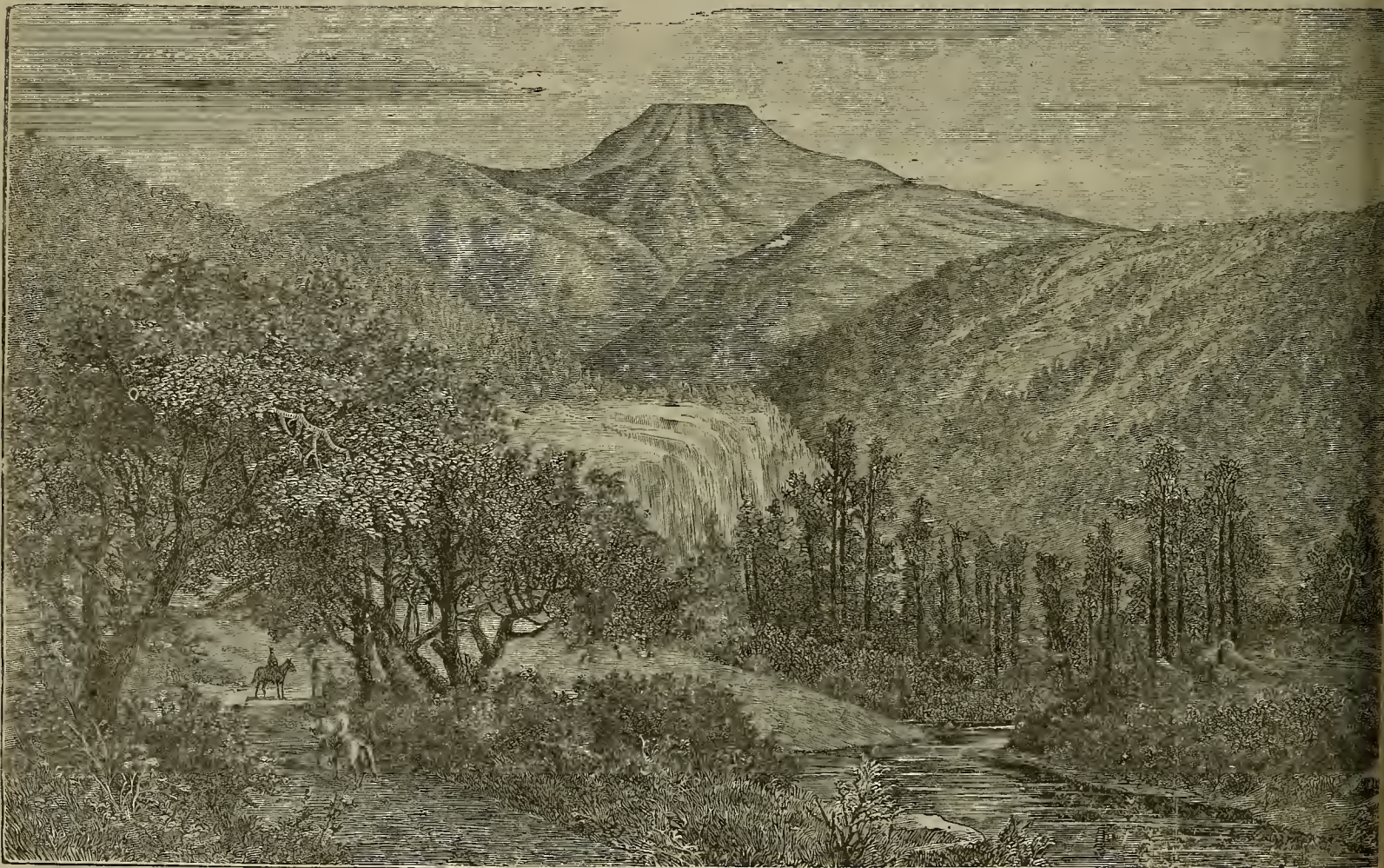
From what we hear, we conclude that there is a large area of fine mineral land in the eastern part of this county, which has only been partially explored, and which shows very favorable indications of immense quantities of hidden wealth, which will be extracted at no distant day, by the combined efforts of hardy miners and enterprising capitalists. The railroad has opened up a large extent of country, barren, desolate and apparently worthless, but which the indefatigable prospector has proved, by months of weary explorations, to be a land of gold, silver, copper, borax and other substances which are a source of wealth, now brought within the reach of even ordinary capital.

The greatest drawback to the prospector has been the scarcity of water; but now it can be obtained at any point on the railroad for two cents a gallon, by applying to the proper railroad officer, who will order the water car to stop at any convenient point for the benefit of prospectors.

The other day we obtained a few items of interest from S. W. Fulton, who has been out

Mining with British Capital.

English capitalists have no objection to putting a few sovereigns in mining enterprises whenever convinced that they will get them out again with a fair prospect of a few more. Accordingly they are working mines in nearly all the Pacific States and Territories. We simply wish at this time to note the operations of two English mines in California for the last half of the year 1882. These are the Plumas Eureka and the Sierra Buttes. The first-named produced 29,460 tons from its respective claims during that period. All this ore was reduced, besides thirty tons previously on the dumps. The ore yielded only \$6.60 in free gold, and yet it was worked at a profit, because the expense of mining, including prospecting, was only \$3.35, while the cost of milling was only forty-five cents per ton, making a total expense of \$3.80. The net balance for the half year was \$141,600, and out of this sum a dividend of \$70,313 was recommended. This has since been paid. The mine has given to its stockholders to date the sum of \$1,730,800. The Sierra Buttes mine produced 15,769 tons of ore during the same interval, all of which passed through the mill. The ore yielded \$7.48 per ton, or, including tailings, \$8.18. The working expenses were \$5.56, including \$4.98 for mining and prospecting and fifty-eight cents for



MT. BACHE (LOMA PRIETA), SANTA CRUZ MOUNTAINS, CAL.

ing the highest point; this has an elevation of 3,780 feet, being less than a hundred feet lower than Mount Diablo. This mountain mass, to which Mounts Choual (3,530 feet) and Ummuhum (3,430 feet) belong, is the dominating one of the range, although there are points farther north which rise to over 3,000 feet.

In crossing over from Santa Cruz, in a northerly direction across the chain, to the Santa Clara valley, before reaching the metamorphic, a mass of rocks is traversed which is much broken and elevated, some of the ridges being fully 2,000 feet high. In rising on to this elevated ridge, from an elevated point near the summit, an extensive view is to be had of the southern part of the range of the high and deeply eroded ridges of Mount Bache to the east, and of the ranges to the northeast, which are also lofty and rugged, rising in some places to nearly 3,500 feet in elevation. The scenery on this road from Santa Cruz to San Jose is hardly surpassed in grandeur and beauty by anything in the coast ranges. There are heavy forests of pine, firs and oaks, which almost vie with those of the Sierra in size and vigor of growth.

The metamorphic belt, before spoken of as occurring on the east side, forms the highest ridges of the range. The higher masses extend from a point back of Redwood City, southeast

some of the most delightful and attractive farming lands of the State and are now being largely planted with trees and vines.

The Santa Cruz mountain district is rapidly becoming one of the most famous in the State for rural improvement, and is certainly a most desirable district.

A NEW KIND OF BELT.—A new method of manufacturing belts or bands for machinery, which comes from Paris, is applicable to rubber, woven tissues of gutta-percha, and consists in making the belt in longitudinal belts or grooves, the main object of which is to increase the capacity of the belt on the same cross section, say twelve inches, by the extra strength put in the same space, and also to prevent so much stretching and variation. Another modification of the same invention is grooving one side of the belt the same as saw teeth, then putting these two pieces together, leaving a plain bearing surface for contact besides, thus making a double belt, which is less liable to stretch or to warp. Especial machinery is built for the purpose, and the claim for it is that better contact is given. The pores are closed during this grooving process, the belts have a higher resisting power, and do not twist on the pulleys. The grooves may be regular, irregular, spiral, or crossed.

SOME of the best mining authorities are now beginning to think that the main Comstock goes north, through Utah, instead of east, as heretofore supposed.

with Tom Ryan and Chas. Ells, prospecting in the vicinity of Sacramento Springs, a station seventeen miles from the Colorado by rail, and about six miles in a direct line. There are mines in this neighborhood that were worked twelve or fourteen years ago by the soldiers, who hauled their ore to the river, where it was loaded on the steamers that ply up and down the river. Thousands of dollars' worth of work was done on these mines, and the reason they were abandoned was on account of the Indians and the expense of transportation.

Recently some of these mines have been worked, and they are showing up well. A number of parties prospecting in the mountains there have taken up claims that look well. Mr. King, an assayer, is located there with his family, and is busy taking assays. He is interested in a number of mines with Messrs. David Nagle, Smith and Hoover. The latter is recorder of the district. Recently they shipped about six tons of ore to San Francisco, the highest assay of which reached \$2,900 to the ton. Messrs. Fulton, Ryan & Co. have secured some fine looking claims, and have brought in some specimens to be assayed. It is stated that there is an abundance of desert willow in the mountains where the mines are located, and plenty of other kinds of timber on the river. The formation of the ledges denote permanence. They carry silver and gold, and some copper. We were assured that a better country for prospecting could not be found. The miners there are sanguine that a bright future is in store for this section of country, and feel confident they will be richly rewarded for their labors.

milling. Excluding the work on the eight and ninth levels, the working expenses were \$4.15 per ton. The net balance for the half year was \$43,800, from which a dividend of \$30,625 was recommended. This has since been paid, and makes a total of \$1,460,300 given to stockholders to date. The accounts between the Company and the bankrupt firm of Cross & Co have been written off and finally settled. Here are two low grade quartz mines in this State that are being worked by English capital at a profit. Are there not other quartz claims of equal value now lying idle? Is it not possible for Americans to work mines in the same districts as cheaply as the English? We ought to do better with our mines than foreigners. It is a sad commentary on our enterprise and sagacity that Englishmen can do better with our resources than we can ourselves. There are large quantities of \$6 and \$8 Gold quartz rock in this State waiting development.—*Bulletin*.

It is said that the Homestake Mining Co., Black Hills, will erect a 200-stamp mill. It was only a few years ago that a sixty-stamp mill was the largest in that camp. Then came an eighty-stamp, and afterwards two 120-stamp mills.

THE Copper Queen mine, of Arizona, produced 1,138 tons copper in the first quarter this year.

A SAN FRANCISCO company purchased the Onondaga mine in Safford District, a few days ago, for \$112,000. Safford, the discoverer of the mine, is to receive one-third of this sum.

The Opium Evil at the East.

Our Eastern friends are waking up widely to the great vice of the Chinese, that of opium dissipation. They find, as we have found, that the Asiatics not only ruin themselves with the drug, but are enticing Americans, both young and old, into their base haunts, and accomplishing their physical and moral ruin. The reports from New York and Chicago tell of such revolting acts as the enticing of school girls into their base dens to be drugged and destroyed. In the degrees of crime this is the basest, and cries most loudly for condign punishment. They find also at the East that the vice has possessed itself of elegant apartments, and is gaining adherents among the women of the upper classes. Thus it is striking at the welfare of the whole people, and Eastern people fully appreciate that it must be stamped out with no gentle heels.

The action against the opium demons in New York city is brought by the priests of the Catholic church and they are deserving for credit for their summary and vigorous movement. They were most annoyed by the orgies of the Chinese, for their churches and people were in proximity to their worst strongholds. They suffered at first for their efforts, but they are now gaining the victory, for the officers of the law and public sentiment are now coming quickly to their aid. What has been done is thus described in a dispatch from New York on Wednesday morning:

Father Barry, of the Church of the Transfiguration, the society which is moving for the expulsion of the Chinese from Mott street, said to-day: "We have had no such Sunday for years in this neighborhood as the last. It was, at least, outwardly decent and orderly. We could get through the streets without being insulted, and the air was not made hideous by yells and loud talk that generally make Sunday here a pandemonium. So far, we have attained the only object we had in the beginning of this agitation—outward decency and order. As for opium smoking, I don't feel able to hope that it will be suppressed." Being asked if the matter will be brought formally before the Grand jury and legal proceedings instituted, he said: "I suppose that will be done. It is very difficult, however, to get correct evidence on the subject. We can all swear we have seen little girls go into these places and that they stayed there for hours. We know the character of the occupants, and we must draw our own conclusions. Of course it is a very difficult matter to get a confession from one of the interested parties, and if evidence of the commission of any iniquity beyond opium smoking is required as proof, we cannot produce it. All the decent residents of the vicinity, without distinction of race or creed, have come forward voluntarily and offered us their aid, and some of them have made tenders of money. That shows that there is no prejudice in the matter. Israelites, Protestants and Catholics have united in giving testimony to the existence of the evils, and in their offers of assistance to us."

Some of the leading journals of New York are apparently shielding the vile opium fiends with statements that there is no law which pronounces opium smoking a crime. If that be so, the sooner they make such a law, the better for the welfare of their people. They will find that the evil with which they have to contend, face to face, is no easy thing to vanquish. They will find that with the strongest laws they must exercise constant vigilance and act promptly and zealously, if they would save their young people from ruin and their old people from suicidal folly. It is only by constant work that the vice is kept within any bounds in California, and even with that, it is ceaselessly drawing its victims from all walks of life and bringing sorrow to many households. We have to fight it in city and in country. There is no need of being tender fingered about it or to attempt to bring it under the rank of class persecution. It is a vice which the Chinese authorities abominate and do their best to stamp out in the Empire, and the people of the United States owe it to their own safety and to the welfare of the sojourners among them, that the ways of the opium purveyors and users shall be made as hard as possible.

WHEN entry is made of a mining claim and the money paid for the land, the receiver of the local land office in which the claim is entered, fills out two receipts for the amount paid: one of these is transmitted with the final certificate of entry and the papers, and the application to the general land office. The other receipt is given to the purchaser. When patent is issued it is delivered to the party holding the duplicate receipt, who surrenders the same. An attorney for the owner, or any one else holding the duplicate receipt, can obtain possession of the patent. Usually this receipt is held by the attorney in the case, who holds it until he gets his fee.

MILL SITES.—By a recent ruling the claimants of mill sites are permitted to cut and remove timber thereon for the purpose of constructing mills, reduction works, tramways, or other accessory required in developing their mining interests. In permitting the removal of timber from a mill site, or tract of non-mineral land prior to the issuance of a patent therefor, it is strictly forbidden to make such timber an article of sale for private gain or speculation.

USEFUL INFORMATION.

Painted Diamonds.

The latest fraud in precious stones furnishes a serious confirmation of the law of chromatic contrasts, and an unexpected illustration of Shakespeare's saying:

To gild refined gold, to paint the lily.

About six months ago, the owner of a magnificent gem, which he had supposed to be a Brazilian diamond of the first water, suddenly found it reduced to about one-fifth its value by being accidentally washed with soap-suds. This simple process revealed its true character as a yellow African diamond of inferior grade. This trick, which was originally played in Paris, has since been reproduced in this country, and, it is rumored, that a single firm on Chatham street was thus windled out of many thousands of dollars without being able to detect the perpetrator of the fraud.

A case of the sort is now in the New Haven courts, being tried by Judge Denning, some of the particulars of which may be of interest, and serve to put persons on their guard against what is really an ingenious deception:

Jacob Nepel, a manufacturing jeweler in that city, had several diamonds, apparently of great value, which he disposed of by an agent to Mr. Edward Engel, a diamond broker of seventeen years' experience. The gems were faultless, but the low price set on them awoke suspicion that they were either stolen or spurious. Several local dealers examined them, using a microscope for the purpose, and pronounced them fine old mine diamonds, and worth five or six times their price. Mr. Engel then took them to New York, and exhibited them to Messrs. Heller & Bardell, importers and dealers in precious stones, who were also deceived by the appearance of the gems, until the owner mentioned his suspicions. Mr. Heller, remembering to have heard of a new process of painting diamonds, took one of the studs, estimated to be worth from \$1,000 to 1,500, washed it in soap-suds, and found it to be a cheap African diamond, worth perhaps \$140. The rest of the set proved to have been tampered with in a similar manner. On returning to New Haven, Mr. Engel sought redress through the courts, and probably will get it.

The explanation is as follows: The common African diamonds are naturally a honey-yellow. On dipping one of them for a few minutes in an aqueous solution of aniline violet, and then letting it dry, it will be found that, while the luster remains unimpaired, the color is changed from yellow to the fine steel-blue usually observable only in the best stones. The two colors, yellow and violet, it will be noticed, are complementaries, and, on blending, produce the brilliant result described. The aniline is easily removed by the application of soap-suds, the water being tinged, not violet, but green, while the diamond regains its original yellow hue.—*Scientific American*.

A USEFUL KIND OF SOLDER.—A soft alloy, which attaches itself so firmly to the surface of metals, glass, and porcelain that it can be employed to solder articles that will not bear a very high temperature, can be made as follows: Copper dust obtained by precipitation from a solution of the sulphate by means of zinc is put in a cast iron or porcelain lined mortar, and mixed with strong sulphuric acid, specific gravity 1.85. From twenty to thirty or thirty-six parts of the copper are taken, according to the hardness desired. To the cake formed of acid and copper there is added, under constant stirring, seventy parts of mercury. When well mixed, the amalgam is carefully rinsed with warm water to remove all the acid, and then set aside to cool. In ten or twelve hours it is hard enough to scratch tin. If it is to be used now, it must be heated so hot that when worked over and brayed in an iron mortar it becomes as soft as wax. In this ductile form, it can be spread out on any surface, to which it adheres with great tenacity when it gets cold and hard.—*Polyt. Notizblatt*.

LAYER BREAD is made of a seaweed (*Porphyra laciniata*) found growing on the low rocks. The women gather it in large baskets and carefully pick it over, wash it, and then pick out any other sort of seaweed that may get in with it. It is then thoroughly washed again to remove all the sand, after which it is boiled for about two hours, then chopped up with a knife, rolled into lumps, and sprinkled with oatmeal to keep it together and make it look clean. It is only made along the Glower and Devonshire coasts, where a great many women earn their living by making it. After it is cooked it will keep for about three or four days in summer, and for about a week in winter. Most of it is taken to the Swansea market, for which a great deal is sent from Devonshire, where the seaweed grows more abundantly than about Glower. It is sold at 3d., 4d., and 5d. per pound. The poor people are very fond of it, and eat it either fried with bacon grease, or else cooked like a vegetable with meat.—*Kerr Report*.

FLUX FOR IRON OR STEEL.—It may be useful for some of our readers to know that a flux for welding iron or mild steel can be made as follows: Take one part of lime to two or three parts of river sand, such as a plasterer would use for a finishing coat.

THE EFFECT OF HEAT ON FLOUR.

It frequently happens that wheat or rye flour, in spite of the greatest care in baking, yields an inferior loaf, and the failure is commonly attributed to adulteration; but when submitted to investigation, neither microscopic nor chemical tests reveal any adulteration. Such flour is returned to the miller or dealer as unfit for use. The miller says the flour was injured by the heating of the stones, and the dealer attributes the defect to the circumstances that the sun must have shone upon the sacks during transportation. It has been proved by numerous experiments that flour cannot bear the action of the sun, even when not exposed directly to its rays. When flour is exposed to the heat of the sun an alteration takes place in the gluten similar to that produced by the heating of the stones. For this reason it is advisable that the transportation of flour should take place, if possible, on cool days or by night, as well as that flour should be stored in a cool place. *Boston Journal of Chemistry*.

UTILIZATION OF DISEASED POTATOES.

A correspondent of the *Journal of the Society of Art*, says: I know from practical experience that M. Bourlier and M. Herve are quite correct as to the value of diseased potatoes as an article of food for cattle, pigs, etc., but the most important item to be observed they omit in their directions, which I revise as follows: Boil the diseased tubers fast till done; drain, and let them become perfectly dry by spreading them out on sieves—a gravel screen is the best. The tuber, when cooked, is free from poison; the water in which it is boiled is very strong poison, and will scorch, if not kill, any animal that partakes of it. When dry, run tight into any kind of dry cask (with salt), and keep in a cool place till wanted. One boiler full can be dried and packed while the next is cooking, so that a large quantity can be cooked in one day. Every farmer should know this, as it would save him suffering any loss, however bad his crop might be.—*Geo. Wm. Pissall*.

COLORING PHOTOGRAPHS.

A new method of coloring photographs has been patented by Mr. Jesse W. Hyman, of Englewood, N. J. The process consists in immersing the photographs in a solution of naphtha, paraffine, mastic drops, ether, and vinegar, and applying to the back, in oil paint, the desired shade and tone, and also applying a mixture of glue and glycerine to the back and pressing the back to canvas until cohesion takes place, whereby the whole picture will be flexible and have the appearance of having been painted on the canvas.

GOOD HEALTH.

Chills—Their Causes and Consequences.

Catarths should receive careful consideration, instead of the neglect which they generally meet with until they have fastened on the part affected so much as to excite the attention, and perhaps alarm, of the sufferer. Here, however, we propose to say a few words about the causes of chills.

A person in good health, with fair play, easily resists cold. But when the health flags a little and liberties are taken with the stomach or the nervous system, a chill is easily taken, and according to the weak spot of the individual, assumes the form of a cold, or pneumonia, or, it may be, jaundice. Of all causes of "cold," probably fatigue is one of the most efficient. A jaded man coming home at night from a long day's work, a growing youth losing two hours' sleep over evening parties two or three times a week, or a young lady heavily "doing the season," young children at this festive season overfed and with a short allowance of sleep, are common instances of the victims of "cold."

Luxury is favorable to chill taking; very hot rooms, soft chairs and feather beds create a sensitiveness that leads to catarrhs. It is not, after all, the "cold," that is so much to be feared as the antecedent conditions that give the attack a chance of doing harm. Some of the worst colds happen to those who do not leave the house or even their bed, and those who are most invulnerable are often those who are most exposed to changes of temperature, and who, by good sleep, cold bathing, and regular habits preserve the tone of their nervous system and circulation.

Probably a good many chills are contracted at night or at the fog end of the day, when tired people get the equilibrium of their circulation disturbed by either over-heated sitting rooms or under-heated bedrooms and beds. This is especially the case with elderly people. In such cases the mischief is not always done instantaneously, or in a single night. It often takes place insidiously, extending over days or even weeks. It thus appears that "taking cold" is not by any means a simple result of a lower temperature, but depends largely on personal conditions and habits, affecting especially the nervous and muscular energy of the body.—*Lancet*.

CURE FOR IRY POISONING.—Bathe the parts affected with sweet spirits of nitre. If the blisters be broken, so as to allow the nitre to enter the cuticle, more than a single application is rarely necessary; and even where it is only applied to the surface of the skin three or four times a day, there is rarely a trace of poison left next morning.

A MOTHER KILLED BY SUDDEN JOY.

Joy is said sometimes to kill outright, though such cases are extremely rare. A perfectly authentic and quite recent instance of such an occurrence may be worth recording. A certain Mad. Laroche, who kept a little mercer's shop in Paris, had a son who, when his turn came for conscription, unfortunately drew a "bad number," and had to go as a marine to Saigon, where he remained several months. He was then transferred to Guadeloupe; but the letter in which he announced the fact to his mother never reached her. She continued writing to Saigon; and, as her letters received no reply, she fell into a State of profound despair, and concluded that her son was dead. Recently, however, the young man, having leave to return to France, unexpectedly presented himself in his mother's shop and threw himself into his mother's arms. The poor woman, stupefied at his sudden apparition, uttered a cry of joy, then all at once she reeled and fell dead to the floor.

POISONOUS PAPER.

Eighty-four samples of colored paper, supplied by a Massachusetts firm for the use of Kindergarten pupils, show arsenic to be present to a considerable extent in a large number of the papers, and in eight of the specimens, to a dangerous degree. These strips of paper are used by the children in weaving various designs, and, of course, this work is a most natural occasion for the use of nature's unclasp the saliva. The manufacturer, indeed, calls attention to the fact that the most attractive colors contain arsenic cannot, indeed, be made without it, but suggests that there is no danger if the children be taught to work with their mouths shut. Even if a child could be taught to overcome its nature enough to keep things out of its mouth, while it might in a measure diminish the risks from lead and other poisons used in the same papers, it is hardly necessary to say that it would be far from removing the exposure to arsenical poisonings.—*The Medical News*.

THE PULSE OF ANIMALS.

In horses, the pulse at rest beats forty times, in an ox from fifty to fifty-five, and in sheep and pigs about seventy to eighty beats per minute. It may be felt wherever a large artery crosses a bone, for instance. It is generally examined in the horse on the cord which crosses over the bone of the lower jaw in front of its curved position, or in the bony ridge above the eye, and in cattle, over the middle of the first rib, and in sheep by placing the hand on the left side, where the beating of the heart may be felt. Any material variation of the pulse from the figures given above may be considered a sign of disease. If rapid, hard, and full, it is an indication of high fever, or inflammation; if rapid, small, and weak, low fever, loss of blood, or weakness. If slow, the probabilities point to brain disease, and if irregular, to heart troubles. This is one of the principal and sure tests of the health of an animal.

FOR COLD FEET, or bad smelling feet, ventilate the dark dungeons in which they are confined. Wear loose boots, and, so far as practicable, low shoes. Have a relay—a second pair—so that one pair can be airing all the time. Active walking or running warms the feet, but unless the stockings are changed and the feet put into loose slippers, directly after the exercise, less advantage is gained. For bad cases of this disease, exercise the bare feet, go barefoot upon all practicable occasions, as tramping up and down the beach when at the seashore, etc. Improve the living habits at all points. Eat plain food, chiefly meal, fruit and vegetables, and be temperate in eating as well as drinking. Thus shall the circulation be made and kept pure, and caused to flow to the extremities to keep them warm, while cleanliness, in the ordinary sense, will then keep them clean.

TO PREVENT THE SKIN FROM DISCOLORING AFTER A BLOW OR FALL.

Take a little dry starch or arrowroot, and merely moisten it with cold water, and lay it on the injured part. This must be done immediately, so as to prevent the action of the air upon the skin. However, it may be applied some hours afterwards with effect. I learned this when a resident in France. It may already be known here, but I have met with none among my own acquaintances who seem to have heard of it. Raw meat is not always at hand, and some children have an insurmountable repugnance to let it be applied. I always make use of the above when my children meet with an accident, and find that it keeps down swelling, and cleanses and facilitates the healing of scratches when they happen to fall on the gravel in the garden.—*Popular Science News*.

PREVALENCE OF CANCER.

It appears from figures taken from the records of the Board of Health, that cancer—most shocking of all diseases—is a fast-spreading evil in New York city. In 1869, as appears, it was the cause of 304 deaths, a proportion of about one in a hundred of all the deaths recorded. In 1879, 572 persons died of cancer, or about two per cent of all who died within the year. In 1880, there were 659 fatal cases of the disease, a startling increase, and a total greater than that of the victims of scarlet fever in the year.



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SAN FRANCISCO:

Saturday Morning, May 26, 1883

TABLE OF CONTENTS.

EDITORIALS.—Lodes in Placer Claims; California
Iron; Huntington's New Crushing Mill; Influences on
Shots in Blasting, 353. Passing Events; Surface
Ground of Lodes in Placer Claims; Gold for Blowpipe
Examinations; Foundry Notes; Local Astronomical
Observations, 360. Notes from Eureka, Nevada; New
Rotary Crusher, 371. Patents and Inventions; Notices
of Recent Patents; English Investments in Pacific Coast
Mines—No. 5, 364.

ILLUSTRATIONS.—Huntington's Centrifugal Roller
Quartz Mill; Primitive Method of Grinding Ore, 353.
Mt. Pacheco (Loma Prieta), Santa Cruz Mountains, Cal.,
353. Arrangement of Vertical Timbers for Supports;
Temporary Timbering in Circular Shafts, 361.

MECHANICAL PROGRESS.—Lubrication; Casks
and Barrels of Steel; Insulating Wire; A Reminiscence
of Blacksmithing; Steel, Steam, Gas and Water Pipe;
Large Gun-Boring Machines; A Novelty in Fire-Proof
Structure; American Engines in London, 355.

SCIENTIFIC PROGRESS.—The Visibility of
Ruled Lines; The Volatilization of Solids; Putting Pelagic
Animals to Sleep; West Indian Phosphate; An
Ebonite Thermometer; Production of Sulphur in the Soil
of Paris; Dust, Mist, and Clouds, 355.

MINING STOCK MARKET.—Sales at the San
Francisco Stock Board; Notices of Meetings, Assess-
ments, Dividends and Bullion Shipments, 356.

MINING SUMMARY.—From the various counties of
California, Nevada, Arizona, Colorado, Idaho, Mont-
ana, New Mexico, Oregon and Utah, 356-7.

USEFUL INFORMATION.—Painted Diamonds;
A Useful Kind of Solder; Flux for Iron or Steel; The
Effect of Heat on Flour; Utilization of Diseased Potatoes;
Good Coloring Photographs, 359.

GOOD HEALTH.—Chills—Their Causes and Conse-
quences; Cure for Ivy Poisoning; A Mother Killed by
Sudden Joy; Poisonous Paper; The Pulse of Animals;
Cold Feet; To Prevent the Skin from Discoloring after a
Flow or Fall; Prevalence of Cancer, 359.

MISCELLANEOUS.—Early History of the Com-
stock—No. 4; Arizona Outlook; The Coming State;
Black Hills Copper Mine; Marysville, 354. Santa
Cruz Mountains; Mineral Prospects near the Colorado;
Mining with British Capital, 358. The Opium Evil at
the East, 359.

NEWS IN BRIEF—On page 364 and other pages.

BUSINESS ANNOUNCEMENTS.

Air Compressors—Clayton Pump Works, Brooklyn, N. Y.
Mining Engineer—Otto Hermann, S. F.
Irving Institute—Rev. E. B. Church, S. F.
Anderson Springs—Anderson & Petriquin, Lake Co., Cal.

Passing Events.

A very important event for this State was the
starting up this week of the iron furnaces in
Placer county, and as the iron is of fine quality
it will be an exceedingly useful product for
California.

The great Brooklyn bridge was formally
opened on the 24th inst., and is now used for
regular traffic. This marks an era in the engi-
neering world.

The opening of the National Exhibition of
Railroad Appliances at Chicago this week is
another important industrial event. California
will be represented there by several important
inventions which are practical in their nature.

The laying of the foundation stone of a new
astronomical observatory this week is a matter
of interest to local scientists.

The general news from the mining regions is
quite encouraging in its nature. Miners every-
where are busy and the business of mining is
gradually gaining in public esteem as legitimate
work is steadily pursued, while stock gambling
is on the decline.

LEWIS E. ARCHERSON, long and favorably
known as a mill man of much experience, and
as an assayer of more than ordinary ability, and
highly esteemed for his personal qualities in
many of the camps of the coast, died recently
at Richmond, Indiana, of pleuro-pneumonia.
His last professional engagement was with the
Hope Mining Company, of Phillipsburg, Mont-
ana.

Surface Ground of Lodes in Placer Claims.

The Commissioner of the General Land Office
a short time since held for cancellation an en-
try of lode claims in Montana, because
the ground covered thereby had been previ-
ously patented as placer claims, said pat-
ents having been issued in April and May, 1881.
It appears that the lode applicants located their
claim May 5, 1879, filed application for patent
November 2, 1880, notice whereof was regularly
published from November 5 to Jan. 6, 1881,
whereupon they made mineral entry No. 611,
January 14, 1881. Their application calls for
"1,497 linear feet of the Shonhar vein, lode or
deposit, bearing silver and other metals, to-
gether with surface ground, varying from 464
to 538 feet in width * * * in the Summit
Valley Mining district, Montana." It appeared
that affidavits were filed of persons resident in
said district, alleging that the Shonhar lode is a
well defined vein, rich in minerals, and that its
existence was known at, and long anterior to,
the date of said placer application.

The Secretary of the Interior, to whom the
case was appealed, says the case, so far as it re-
lates to the question of the existence of a known
lode, is within the rule established by the De-
partment in the matter of the Mammoth Quartz
mine, wherein it was ordered that the lode
claimants be permitted to proceed pursuant to
statutory provisions by application for patent
upon the lode claim, by regular publication,
subject to the filing of an adverse claim and by
institution of suit in a court of competent juris-
diction. This case we refer to in another
column of this number of the PRESS.

In rendering his decision the Secretary of
the Interior says: "But the present claim ex-
ceeds twenty-five feet in width, on each side of
the vein. The application has been allowed,
publication regularly had, and the entry made.
In fact, said claimants had completed their
proofs, and the same were matter of record in
your office, for several months prior to the is-
sue of the placer patents, and no adverse
claim was filed. It would not be practicable,
therefore, at this stage of the case, to remit
these claimants to the performance *de novo* of
such preliminary requirements. In the absence
of an adverse claim they are entitled to take
their lode and twenty-five feet on either side.
The only question remaining is whether or not
the excess over that width of surface ground
can be allowed. I think this cannot be done.
The lode claimants, in order to protect their
right to the full extent of their claim, should
have filed adversely to the placer application
within the statutory period; but, having failed
so to do, they are expressly restricted by the
statute to their lode, 'and twenty-five feet of
surface on each side thereof.'"

The decision of the Commissioner of the Land
Office that patent could not issue to the lode
claimants was, therefore, reversed by the Secre-
tary of the Land Office, who directs the patent
to the lode to issue, on the filing of a cor-
rected plat properly defining the restricted sur-
face grounds.

Gold for Blowpipe Examinations.

Gold for blowpipe examinations should be
pure, especially for assays of nickel and copper.
The most convenient form will be found to be
that of a thin foil. If not procurable it can be
prepared as follows: Take a piece of gold coin
and fuse it with three times its weight of silver,
and when in the state of fusion pour into a ves-
sel containing cold water. Collect the granula-
tions thus formed, and dissolve in a flask or
beaker glass with diluted nitric acid. After
boiling for fifteen or twenty minutes decant
carefully, and wash the gold residue with dis-
tilled water; then attack the gold with strong
nitric acid (1.30 specific gravity) for twenty
to thirty minutes. Decant and wash repeatedly
with warm water, then add nitro-hydrochloric
acid and boil until the gold is completely dissolved.
Dilute with water, warm slightly, allow the
solution to settle for about 24 hours, then decant
and add oxalic acid slightly in excess. The
mixture of trichloride and acid to be heated
gently. The precipitation is slow, but is greatly
assisted by heat. When finished, decant and
wash on a filter; afterwards heat over a gas or
lamp flame in an evaporating dish or capsule.
The gold is easily reduced by this means to a
metallic state; then fuse and cast into an addi-

tion of bisulphate of potash, and cast into an in-
got, or any other desirable shape. The gold
can be beaten or rolled into thin foil, and it is
then ready for use.

Mr. George Atwood, in his work on "Blow-
pipe Assaying," recommends the addition of
bisulphate of potash as an extra precaution in
case that a slight trace of silver should still re-
main with the gold before the fusion.

Foundry Notes.

Within the past few months there has grown
up on the shores of San Francisco bay, one of
the largest manufacturing establishments on the
Pacific coast, and which would do credit to
much older communities than our own. The
ground for the works of the Jud-
son Manufacturing company was not
broken until about July 1st, of last
year. Since that time the company has erected
extensive buildings, manufactured tools and
machinery, systematized a large business and
built up a thriving trade, which is rapidly in-
creasing. The works are in the western part
of Oakland, near Emery station, on the line of
the Central and Southern Pacific Railroad and
on the edge of the bay shore. The water front
forms one boundary of the grounds, and the
overland railroad track the other.

A representative of the PRESS recently vis-
ited these works, and like other visitors for the
first time, was surprised at the magnitude of
the "plant" and the marked evidences of
rapid growth which were everywhere seen.
In each of the large buildings are scores
of busy workers intent on allotted tasks,
each doing some one thing or preparing some
one part of the products of the establishment.
Ponderous engines, curious machines, blazing
furnaces and ingenious tools occupy their proper
places; and one may watch a mass of rough
iron come in one door and follow it through
the various processes until it goes out another
in the form of nails, tacks, hardware, agricul-
tural implements, or any of the various pro-
ducts of the place. The buildings themselves
are plain, but light, airy and clean, and it is
apparent that the comfort, health and
convenience of the employees has been consid-
ered, as the matter of light and ventilation has
not been neglected. The establishment is di-
vided into departments, each of which is sepa-
rate in itself, and distinct from the others. The
moving machine shop, foundry, file works, tack
works, paint shop, wood shop, etc., each has its
building and allotted space, and what is more,
each department has its superintendent, who
has his own private office, where he attends to
all in his department.

Without going into any detailed description
of the engines, boilers, the wood or iron-work-
ing machinery, tools or utensils, it will be
enough to say that in its equipment the estab-
lishment is very complete, the machinery in
every department being the most improved and
recent patterns. No expense has been spared
in procuring the very best appliances of all kinds.
Iron tracks are laid all about the grounds, so
that hand cars are used to facilitate the hand-
ling of material. The grounds are all sewered,
and the buildings stand well up off the ground
on brick piers, so the air passes freely under
them. The tide flows each day to the edge of
the grounds, carrying off debris, and the fresh
trade winds come unobstructed from the Pacific
ocean through the Golden Gate, right over the
works.

This company has adopted the plan of mak-
ing its own machinery and tools whenever prac-
ticable, and in their machine shop may be seen,
in all stages of preparation, tack and nail ma-
chines, file machines and tools, and all the var-
ious implements which are used in manufactur-
ing the products of the establishment. There
are lathes, drills and all the tools necessary to
do the very best style of mechanical work.

In the tack factory may be seen the men cut-
ting, by the aid of machines, the flat iron into
strips. There is a pickling room where the iron
is put through a process of pickling to
take off the scales. Going up above by
the elevator, we find a busy scene, where are
the tack and nail machines to manufacture some
200 kinds of nails and tacks, from the tiny iron
tack to the two inch clout nail. There are
twenty machines in this room, and very inge-
nious they are in construction and operation.
Many of them were made on the premises.
Down stairs again we visit the polishing room,
and then the tinning department where the
tacks are tinned. Near by is the bluing room
where the tacks are "blued." Opposite is a
packing room where girls pack up and label the
tacks, ready for market. This industry is an
entirely new one on this coast.

The Judson File Works forms a new in-
dustry on this coast, and having a capaci-
ty of 100 dozen a day. These files have
been tried by the best mechanics and proved
equal to anything ever imported into this mar-
ket. In these rooms are cushioned steam ham-
mers, grind-stones, file machines, etc., for mak-
ing all varieties of files.

In the coal building, they now have on
hand 4,700 tons of Australian coal. From here
railroad tracks are laid and the coal conveyed
to where it is used in the buildings. In the
rolling mill building, the rolls are now turn-
ing out bar and flat iron for the manu-
factures of the establishment and for the gen-
eral market. It was intended to have a capaci-
ty of 30 tons a day, but seems to be doing more

work than that. The furnaces in this mill con-
sume their own gas and smoke; and a magnifi-
cent large engine runs the rolls. The building
is light and airy, and all the arrangements are
well carried out.

There are now some 240 men employed at
these works, but when in full running order it
is expected that 1,100 will be employed. Dur-
ing a couple of months this year they ran night
and day, though now only day work is being
done.

Among the varieties of hardware manufac-
tured at these works are barn-door hangers,
barn-door rollers, rails and pulls, well wheels,
blacksmiths' tyere iron, bench screws, wheel-
barrow wheels, cast washers, carpenters' and
farmers' sledges, and round and square-faced
sledges, hitching weights and posts, wine press
screws, etc. The Judson horse shoe nails form
another very important branch of local manu-
facture. In California Victor Mowers alone, a
large trade is being built up, as they are turn-
ing out ten mowers a day and have built
over 1,000 this season.

The company possesses exceptional facilities as
to site, appliances and resources. They control
the Clipper Gap Iron mines at Clipper Gap,
Placer county, in this State.

From these mines a superior article of iron is
produced, and the new furnaces are now turn-
ing out a large quantity of pig. This is the
largest iron mine on the coast. These works
will use this iron in their manufactures to a
large extent hereafter. Mr. Egbert Judson,
President of the company, was the pioneer
mover in this enterprise, as he has been in sev-
eral other home industries in this State.

Local Astronomical Observatories.

During the past week, the corner-stone of a
new astronomical observatory was laid in Oak-
land, with suitable ceremonies. The observa-
tory is the gift, to the city of Oakland, by a gen-
erous citizen, Mr. A. Chabot, and is intended
particularly for the use of students of the pub-
lic schools of Oakland, and vicinity. Mr.
Chabot does not make any provisions or prom-
ises, but puts the coin in the bank to be drawn
upon, and says, "Go ahead," and they are go-
ing ahead. The telescope is to be a refractor
of eight and one fourth inches aperture,
and will be mounted on a fine substantial pier
30 feet above the ground, and protected by a
suitable dome. All the necessary appli-
ances will be available, and arrangements will
be made for transit observations. The gift is a
timely and handsome one, and science has
reason to be grateful to Mr. Chabot for his gen-
erous disposition.

San Francisco, Berkeley and Oakland will
soon be very well equipped with respect
to telescopes. Capt. Charles Goodall is about
purchasing a large one, which he will put up in
an observatory on his residence. The Board of
Regents of the University of California are about
to order a good instrument for the University,
so the students there will be able to make
observations.

In addition to these, Mr. Charles Burkhalter,
a young gentleman of Oakland, has a four and
a half inch instrument with equatorial mount-
ing, which he has been using some months. Mr.
Burkhalter is an amateur, but did good work
on the occasion of the transit of Venus. He
has constructed a substantial brick pier on
which to mount his instrument, and has himself
made a light revolving dome of wood and can-
vas, so he has now a complete observatory.

The mechanism for the equatorial mountings he
made himself, and he also mounted and ad-
justed the instrument. The whole observatory
is a very creditable job, and as the glass is a
good one, Mr. Burkhalter can do good work.

Berkeley and Oakland, with three large tele-
scopes, are well provided for. It seems strange
that no public-spirited citizen of San Francisco
has come to the front with a telescope for the
public school children. There is only one good
telescope here, and that is a private one,
at the "Davidson observatory," belonging to
Prof. George Davidson, of the U. S.
Coast Survey, and President of the California
Academy of Sciences. He has been very
obliging with it and given many an opportunity
for observation, sometimes to his own inconven-
ience. The instrument is six and one half
inch aperture, by Clark, and is a fine one of its
size.

It seems probable that this State will become
somewhat noted in the matter of astronomical
observations, for we are to have the Lick tele-
scope, of 36 inches, at Mount Hamilton some of
those days, whilst the telescope now mounted
there is a Clark of twelve inches aperture.
There will be a full corps of astronomers, and
the observatory will be completely equipped
with all the necessary appliances; means will be
provided for prompt publication of all important
facts. Great things are expected from the large
telescope in a region where the atmosphere is
exceptionally clear and steady.

Notes from Eureka, Nevada.

[From Our Regular Correspondent.]

On the 19th inst. the personal property of the Albion Company was sold at Sheriff's sale, and thus the company have been relieved of a large portion of their indebtedness. The mine is gradually improving, and great hopes are entertained for entire relief from its present embarrassment.

The Lucan shaft of the Eureka Con. mine has been sunk 20 feet during the past week, and the ground being easier to work than heretofore, an additional 20 feet will be made during the coming week. Drifting towards the ledge will shortly be commenced, when I do not doubt that the mine will be soon placed strong on its legs again.

The Tributary.

In the Phoenix and Jackson mines, have been taking out considerable ore. Two young boys, Hancock and Keefe, have been industriously assorting over the old Jackson dump for several months past, and have displayed remarkable judgment for lads so young, neither of them being over 15 years old. They have paid several hundred dollars tribute to the company, and make a nice profit for themselves. Such enterprise in these youths is highly commendable. Messrs. Robert Waters & Co., who have been leasing the Grant mine on McVoy, or Mineral hill, for the past two years, have taken out several small pockets of ore from time to time, and in running a drift to connect the Geraldine tunnel with the old Grant incline shaft, discovered a rich vein about three weeks ago. Since then they have followed the ore which has opened up, and is now about four feet thick. The vein is of high grade quartz, and in the centre is a very rich character of black metal and yellow chloride, some of which assays as high as \$2,000 per ton. For some time past the ground in the Silver State tunnel has looked very favorable for ore, and a few days ago a strike was reported, but owing to press of business I have not had time to visit it. In the neighborhood of these mines, the croppings are either of massive iron or small blossoms of rich ore.

The Magnet series of mines which lay to the southward, upon the same belt, and to which adjoins the Eureka Tunnel mine, is evidently one of the great properties, that, with development, will in the future become a great ore producer, but for want of capital to open it in good shape little is heard of it.

The Eureka Tunnel

Was never in a more prosperous state than now. The ore being sent up from the North Addison chamber is the richest for the quantity that has ever been taken from the mine. The best of it is being stored in the office, under lock and key, and the entire mass is rich. The South Addison chamber is still yielding good ore. A drift has been started from the engine shaft going north from the 105-foot level, the face of which is in ore somewhat mixed with lime, the ore, however, being rich and easily separated.

The engine shaft is now down 119 feet. Sinking has lately been retarded, but to-day one of the ropes was taken into the tunnel and placed upon the reel, and the other will be put on tomorrow. The cage will be swinging on Wednesday, when the guides will be put in, and all will be in readiness to steam up and resume sinking on Saturday morning. Then look out for an increase in the output of the mine.

At the Alexandria, work is progressing finely, and this mine will soon be heard from.

The Sunset mine has been leased to parties who are highly encouraged with their prospects, and expect to be shipping ore by June 1st.

The Frankie Scott Con. is yielding some good ore, and the Antelope mine, although but little is said about it, is looking better than ever, and the ore is increasing.

Another new strike has been made in Dead Broke mine, but these strikes are becoming so common that the one is no more than reported when another is made. It is a fine property. A valuable strike has also been made in the Dug Out mine. A ledge six feet in thickness has been uncovered in the main tunnel, one foot of which is solid carbonate of lead. A large quantity of rich ore is being extracted from around the old Chambers from where, but a few weeks ago, some beautiful specimens of native wire silver were taken.

The ore output in the Home Ticket mine is increasing, and its neighbor, the Golden Rule tunnel, is showing a really good prospect.

A quantity of very heavy rich lead ore is being uncovered in the Altoona mine on Adams hill. The formation around it is of even grade quartz.

The Republic Mine

On Prospect mountain, is worthy of special notice. A great deal of good ore has been taken out of it lately, and its prospects are above the average of Prospect mountain mines. It has been opened by a vertical shaft, down 40 feet, to a natural cave going down an additional 80 feet, at the bottom and on the sides of which is quartz ore of good quality. All of this is intermixed with carbonate ore. A tunnel has been started, entering the hill at a point calculated to strike the cave at or near the top of it. Twenty tons of ore was shipped to the Richmond furnaces a few days ago, and five tons per day can easily be extracted from the mine.

The Ganges shaft is down 80 feet, and two men are at work in it, taking out a little high grade ore.

There are three men working in the Industry mine, prospecting, and taking out some good ore. The mines of the

Outside Adjoining Districts

Are showing marked progress. Mr. A. G. Rich, of the Enterprise Mining and Irrigating Co., Diamond district, came up from San Francisco last week, and visited the mine. He is evidently pleased with the outlook, as the crew

about 100 feet below the surface. Here the ledge is six feet thick, and two feet in thickness of it is of high grade ore, the balance being of good quality.

At Secret Canyon

The mines are all looking well. Some very high grade ore is being shipped from the Irish Ambassador (the way the name of the mine is recorded, M. H. S. mine.) The

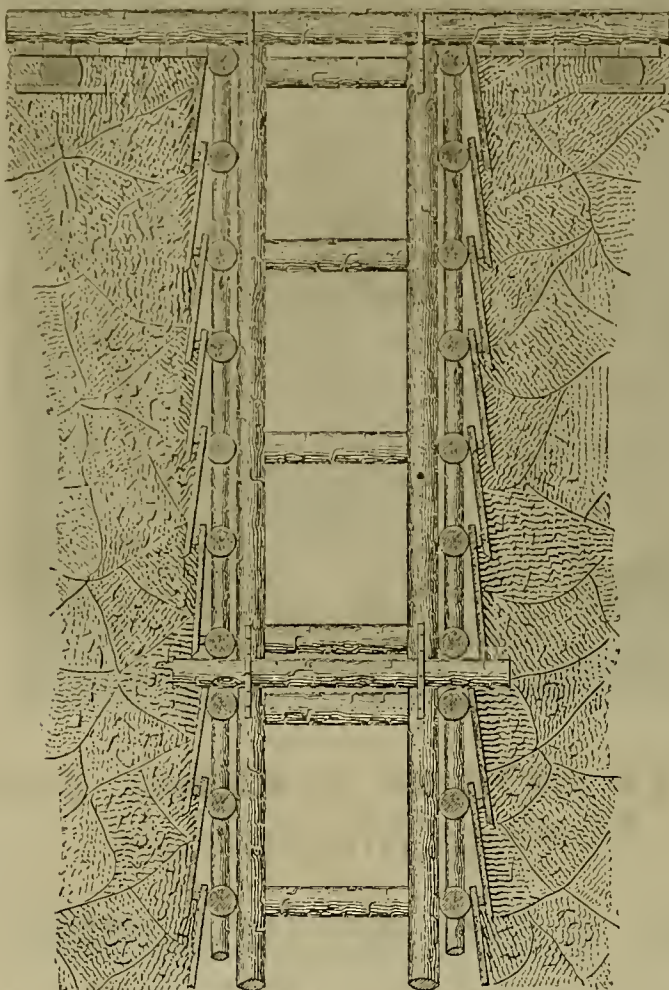


FIG. 1.—ARRANGEMENT OF VERTICAL TIMBERS FOR SUPPORTS.

tion of concentrating machinery upon the ground is to be the result of this visit. When completed more active operations will take place upon the company's property, which is a very extensive one. It is expected that an average of twenty tons of rich ore and concentrations will then be shipped to the furnaces at Eureka per diem. It is estimated that there

Monitor mine main shaft is down twelve feet on a vein of rich ore, which is crossed by a gash vein of quartz. A tunnel is being run to strike under the shaft at a depth of about 250 feet, and although it is only one half the distance it is intended to run it, is showing splendid mineral indications. Some good prospecting is being done in the Metaline mine, and a large

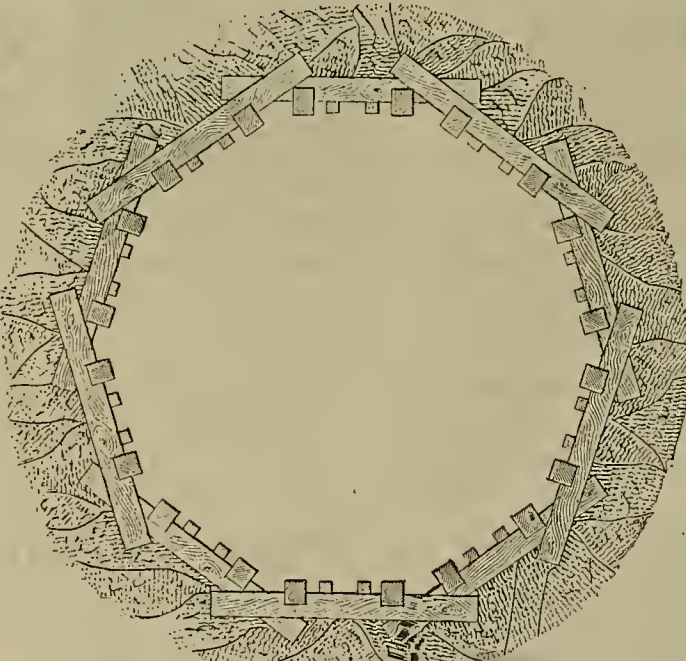


FIG. 2.—TEMPORARY TIMBERING IN CIRCULAR SHAFTS.

are at least 50,000 tons of ore in sight, stripped, and ready to be broken down. The deepest working upon the ledge which carries ore continuously from top to bottom, is about 300 feet. This is known as the Mammoth Ledge, and from it Mr. Phillips, the Superintendent, kindly brought in a fine specimen this morning. It is a nice piece of ore, weighing about ten pounds. Its assay value is \$196.65 in silver, and it carries also sixty-three per cent of lead. It was taken from the Mammoth Ledge, at

quantity of quartz ore, full of chlorite and black metal, is being sent to the surface.

Pinto District.

Active preparations have been commenced upon the Rescue mine, at Silverado, from which good results are anticipated to be derived at an early day. The usual quantity of rich ore is coming from the Queen mine.

A rich strike has been made during the week in the Western Globe. The Fair Play has been leased, and operations resumed, with fine pros-

pects ahead. A patent will shortly be applied for upon the White Rose lode. There is a large pile of quartz and lead ore upon the dump, and the mine looking well, although work upon it has been suspended for the present. A tunnel is being run on the contact of two formations in the Diana mine. This work is intended to systematize the development of the property, which shows considerable ore in sight in the old works. The Berryman Tunnel is progressing slowly, but the work is being done with due regard to economy. A fine prospect is the Ettie Goodman mine, lately located in Pinto district. It has a ledge three feet thick from the croppings, running down to a depth of 20 feet from the surface. It increases rather than diminishes; the ore assays from \$14 to \$35 per ton in silver, and carries a trace of copper. The center of the vein is quartz and yellow carbonate ore. As I have been predicting, Pinto district is receiving renewed attention from prospectors this year, and will no doubt wind up the season prosperously. M. H. JOSEPH.

Eureka, Nev., May 21, 1883.

New Rotary Crusher.

David Bushman, of Quincy, Plumas county, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency, a new form of rotary ore crusher. There is a casing or mortar having at one end a hopper through which ore is fed to the mortar. In the bottom of the mortar, near one end, is a die, made removable. Mounted transversely in the mortar is a shaft, and rigidly secured to this shaft are two disks, under the mortar. Heavy beaters are pivoted between these disks by bolts. These bolts are pivoted at such distances apart that when turned down to lie between the disks the point of one shall just reach and rest upon the base of the other, thus economizing space and preventing choking or clogging by the beaters. At the rear of the mortar, the bottom and bed are curved, and the peripheries of the disks move close to them, and at the other end of said mortar sufficient space is left to allow the beaters to be thrown out horizontally to strike the die. Screens are provided, so the pulp passes out of the mortar when crushed fine enough by the beaters. The disks are revolved towards the hopper, and each beater, after it passes the center of gravity, falls forward and downward from its place between the disks, and strikes its blow on the rock on the die. The continued revolutions of the disks then draws the beater backward over the die, grinding and pulverizing the ore it has broken. This action is repeated by each beater.

The rate of revolutions of the disks determines the force and rapidity of the blows, the latter increasing with the speed as the centrifugal force becomes greater. The blow delivered upon and the subsequent dragging of the beater over the rock have a beneficial effect in thoroughly disintegrating and reducing it to a fine pulp. Any of the beaters may be removed and replaced when desired.

Timbering in Mines, No. 10.

Fig. 1 of the accompanying engraving indicates the arrangement of timbers and supports by which vertical pieces can be made to serve as supports.

Fig. 2 represents the temporary timber framing for circular sections on the French system. These frames are placed a short distance apart, supporting the facing boards, and are rendered solid by the cross timbering. Slips are also nailed or pinned to and on the support. These methods may be used according to the nature of the ground being mined. The engravings are sufficiently clear in themselves and need no detailed description.

CALIFORNIA RAILWAY APPLIANCES.—California will be represented at the coming exposition at Chicago of railway appliances. General Master Mechanic A. J. Stevens, of Sacramento, has sent a model of his new improved valve motion for locomotives. By this invention, the eccentrics, links and all the appurtenances usually placed between the frame of the locomotive and under the boiler are entirely done away with. The merit of the invention is, that steam can be cut off at any point of the stroke and retain the cylinder full of steam to the extreme end of the stroke. This, it is believed, effects a saving of thirty-three and a third per cent. of steam, and, consequently, also of fuel. Mr. Stevens has also sent drawings of the new mammoth locomotive that is being constructed at the Sacramento shops, and to be named El Gobernador (The Governor). This engine will be much larger than the one in use at Tehachapi, which is at present the largest in the world. The exposition opened on the 24th instant, and will close on the 23d of June.

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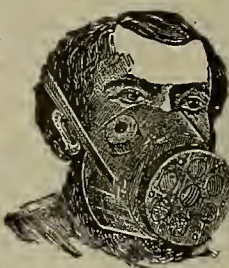
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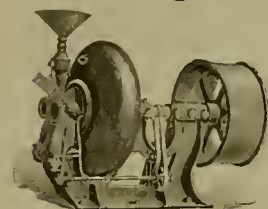
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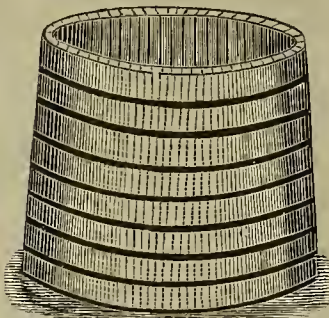
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1100 East Cumberland St., PHILADELPHIA, PA.

Manufacturer of all kinds of Chemical Stoneware—FOR—Manufacturing Chemists. Also Chemical Bricks for Glover Tower.



PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING MAY 15, 1883.

- 277,826.—SULKY DIRT SCRAPER—H. M. D. L. Baboon, Modesto, Cal.
 277,444.—TUBULAR LANTERN—E. Boesch, S. F.
 277,452.—MACHINE FOR CUTTING CIGAR WRAPPERS—J. Brandt, S. F.
 277,543.—ROTARY CRUSHER—David Bushman, Quincy, Cal.
 277,463.—HORSE COLLAR—Wm. Cosbie, S. F.
 277,547.—CUT-OFF FOR SCREENING DEVICES FOR FLOUR, ETC.—Geo. Cottrell, S. F.
 277,552.—RAILWAY SWITCH—Thos. J. Daly, S. F.
 277,554.—APPARATUS FOR MATURING SHERRY WINE—M. T. De Abreu, St. Helena, Cal.
 277,490.—WHEEL GUARD FOR R. R. CARS—Jos. Jacobs, S. F.
 277,578.—ORE CRUSHER AND PULVERIZER—Jas. H. Kinkadee, Reno, Nev.
 277,762.—HYDRAULIC MINING APPARATUS—J. H. Martin, Bidwells Bar, Cal.
 277,590.—WRENCH—Jos. McAlpin, S. F.
 277,598.—FOUNTAIN—M. M. Murray, Coulterville, Cal.
 277,630.—CANISTER—C. M. Symonds, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

CUT-OFF FOR SCREENING DEVICES FOR MIDDINGS, FLOUR, ETC.—George Cottrell, S. F., Cal. No. 277,547. May 15, 1883. This invention relates to a new and useful cut-off to be used in connection with purifiers, reels, centrifugal machines and other screening devices for separating the different grades of middlings, flour, etc. In machines for this purpose, whatever may be their character, the material is sifted through the cloth sieve, reel, or other screening device to separate the good from the poor. The good passes through and is directed down to suitable screw-conveyors, by which it is carried off. In this operation, when the material first passes upon or into the screening device, it lies in such quantities that none but the good stuff can pass through, but as it reaches the farther end and becomes thinned out the poor material works its way through also, to some extent. It has been the practice heretofore to arrange under the screening device slides, or what are usually called "flop-boards," which, as their name implies, are flat boards, which can be turned from one inclination to another to direct the material into one or the other of two conveyors. When it is found that at a certain point in the screening device the material comes through, poor with good, then a flop-board at that point is turned so as to direct the stuff into a separate conveyor, from which it is taken and passed through again. The objection to the slides is that they are inconvenient, and the fault with the flop-board is that they do not fit closely enough to form tight joints. The object of this invention is to provide an improved means for accomplishing a perfect result; and it consists in a number of spouts or clutes hinged upon the center board separating the conveyors and having semi-circular sides adapted to fit in slots or grooves made in the under portions of the separating partitions, secured between the walls of the hopper or gather-boards above. The spouts are thus made to form close joints with each other, and may swing from one inclination to the other without allowing any material which falls into one to get into the other.

APPARATUS FOR MATURING SHERRY WINE.—Mannuel T. De Abreu, St. Helena, Cal. No. 277,554. May 15, 1883. This invention relates to an apparatus for maturing sherry wine; and it consists in a novel construction and combination of parts. In the maturing of sherry wine it is customary to expose the casks or tanks containing it to a long continued heat, and for this purpose they are usually placed in buildings or chambers which may be closed tight. Within these buildings the tanks or casks are subjected to the action of hot air from furnaces or heaters until the desired change is effected. Great care must be exercised not to let the heat become too great, and also to prevent fires, and in any event the casks become dry and must be re-coopered, and a considerable percentage of the wine is lost by evaporation. In this invention there is a house or chamber to receive tanks or casks and above it is a glazed structure, one opening into the other. The heat of the sun is intensified and retained so a high temperature is allowed. The heat produced in the upper glazed structure circulates freely in the lower one, and sherry wine is thus matured with very little artificial heat. Heating pipes are arranged for night and cold or cloudy weather.

RAILWAY SWITCH.—Thomas J. Daly, S. F., Cal. No. 277,552. Dated May 15, 1883. This

invention relates to railway switches of that class in which an arm or device attached to the car is adapted to come in contact with and operate a lever in the road-bed to throw the switch. It consists in the construction of a peculiar arm attached to the car, and in the novel arrangement and construction of the actuating lever in the road-bed, together with a swinging cover to protect it. The object of this invention is to provide an automatic switch especially adapted for street railways. By reason of its construction, the switch rail will remain normally closed, but will be thrown in readiness for the front wheel, and will thereafter be controlled by said wheel, and by the arm upon the car until the rear wheel takes charge of it, which it will close again for the straight track.

WRENCH.—Joseph McAlpin, San Francisco, Cal. No. 277,590. May 15, 1883. This invention relates to a new and useful wrench; and it consists in suitable jaws fitted one upon the other, to move together or apart, and in a handle connected with one jaw by a knuckle-joint, and with the screw-shank of the other by a loosely seated or swiveled ball-nut, whereby said jaws may be adjusted by the nut and their grip tightened by the power applied to the pivoted handle. The object of this invention is to furnish a wrench having not only the ordinary power of gripping, but one whose grip is increased in proportion to the power applied to operate it to avoid slipping, and further, to provide a wrench which may be readily used in small space with facility and with great power.

FOUNTAIN.—Maurice M. Murray, Coulterville, Cal., assignor of one half to Alexander G. Black, of same place. No. 277,598. May 15, 1883. This invention relates to an improved vessel for containing liquids and keeping them cool or warm, as may be desirable. It consists in an outer vessel having a pivot adapted to revolve in a step of a base, and provided with interior divisions for various liquids, in combination with a removable cover, through which a series of funnels project, and carrying on their lower ends the stoppers of the interior vessels, whereby the inventor is enabled to fill all the interior vessels and main vessels without removing the cover.

HAY RAKE AND LOADER.—Ebeuezer B. Towl, Franktown, Nev. No. 277,174. Dated May 8, 1883. This hay loader consists in a wheeled frame, adapted to be attached behind a wagon, and provided with a peculiar directing apron in which a novel toothed cylinder revolves, and from which a traveling draper extends to the wagon, whereby the hay is picked up by the cylinder, elevated to the draper and by it carried to the wagon. The object is to provide a simple and effective machine to load hay upon a wagon to which it is attached, and which it follows.

CANISTER.—Clarence M. Symonds, San Francisco, Cal., assignor to George H. Tay & Co., of same place. No. 277,630. May 15, 1883. This invention relates to an improvement in canisters, such as are usually employed to contain tea, coffee or spices—and in an open and pivoted closing slide upon the top.

News in Brief.

BISMARCK is framing a plan of an Imperial insurance department, the duties of which will be to supervise insurance companies in Germany.

THERE were twenty-two deaths from yellow fever during the past week at Cuba, mostly in the military hospital.

THE cost of the Brooklyn, N. Y., bridge, so far, has been \$14,627,379.69. The cash on hand is \$62,526.14, and the liabilities are \$146,166.45.

THE City of Peking, on her next trip from Hongkong, will bring about 400 Chinese passengers, coming back to San Francisco on their return certificates.

CHINESE are being smuggled into Washington Territory from British Columbia. Fight are reported to have been murdered by Indians who were rowing them across.

MANY Americans have left Paris for Moscow, among them Mr. Mackey of the Comstock, who makes the journey with his family in his own palace car, in a style that creates great astonishment.

FROM advices received from points in Illinois visited by the cyclone Friday night, 63 deaths have already been reported in the State, and the number of injured is estimated at very nearly 200.

THE five sea elephants which left San Francisco on the 11th instant, arrived in New York on Saturday evening. Two of them will, in a few weeks, be sent to the London Zoological Garden, and the others to the Jardin des Plantes, Paris.

THE other day the Portland, Me., dry dock was opened for a vessel to come in, and after the gates were closed and the water pumped out, it was found that a large school of herring had been captured.

THE mineral exhibit at the Denver Exposition grows in magnitude every day. The counties in Colorado, under the State law, have thus far appropriated \$50,000 for the mineral collection.

CONTAINING all the essentials of a true tonic, and sure to give satisfaction, is Brown's Iron Bitters.

English Investments in the Pacific Coast Mines—No. 5.

[Prepared for the MINING AND SCIENTIFIC PRESS by H. DEGROOT.]

The Utah Silver Mining Company (Limited).

Another London incorporation, with a capital stock of £100,000—10,000 shares of £10 each—purchased in 1872 from Buel & Bateman a group of mines in Bingham Canyon, consisting of the Red Warrior, Dartmouth, Portland, Belshazer, and one or two others, paying, as usual, an unduly large price for the same, none of these so-called showing at the time much good ore or being much developed. Two smelting furnaces having a joint capacity of thirty tons per day were soon after erected near the claims, and run for a year or two with but moderate results. The ores of this company, like the most of those in the Bingham district, ran low in silver though rich in lead; the bullion made here being worth but \$125 per ton—the poorest produced in Utah Territory. Below the oxidized zone the ores grew base, iron as sulphuretted becoming very pronounced. This change in the character of the ores necessitating their being dressed before going to the smelters, the company put up costly works for that purpose; shortly after these dressing works had been completed the ores underwent still another transformation, changing suddenly to an almost solid zinc blend, and becoming so poor in galena as well as silver, that they could no longer be worked with profit. As a result the company was obliged to give up working their mines, though the dressing machinery continued to do some custom work for a while longer. But the earnings from this source being insufficient to keep life in the concern, operations of all kinds were finally suspended. No dividends were ever paid by the company, and, except a trifle realized from the sale of their plant, the money invested proved a total loss.

Mammoth Copperopolis.

This mine is located in the Tintic mining district, Juab county, and about 75 miles southwest of Salt Lake City. It is on the same vein as the Crismon-Mammoth, a mine that for many years has enjoyed an excellent reputation, and which it adjoins on the south. The vein is a very large one, and carries ores rich in gold, silver and copper. In one of the excavations made on this lode it presented the remarkable feature of a stratum of rich auriferous quartz lying by the side of a 12-foot vein of copper ore, the former constituting the foot-wall of the latter.

The mine was sold to an English company in 1871, who at once erected a ten-stamp mill for reducing the free gold-bearing ores, and also two furnaces for smelting the copper and silver ores. The gangue in this lode consists mainly of a granulated quartz, carrying besides gold and silver a large percentage of copper carbonates, oxide of iron, zinc blende, bismuth and a small quantity of lead. The mine has been well prospected and somewhat developed by means of several large surface openings and by tunnels, one of which intersects the lode at a depth of 200 feet; a shaft has also been sunk on the lode to a depth of sixty feet. From these openings large quantities of high grade ore were extracted in 1872 and shipped to Liverpool. The first class ores here run about thirty-five per cent of copper, fifty ounces in silver and usually a little gold, some of the ore being very rich in that metal. While the English company, after the custom in those days, paid a great deal too much for this property, the investment, had the enterprise been well managed, might still have proved a good one. But the business at the mine seems to have been badly conducted, costly plant, both a mill and furnace having been put up in advance of ore development, and much money wasted in road building and other improvements not strictly necessary. In locating the reduction works the blunder was made of placing them at a point where it was impossible to get enough water to keep up steam more than a few months in the year. Struggling along for a few years without making any net earnings or even defraying current expenses, the company became embarrassed and finally suspended operations, the most of the money invested in the enterprise being lost.

Cheap Ore Pulverizer.

There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First St., a Rutherford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. Reference as to above can be had upon applying to this office.

Complimentary Sample Copies of this paper are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage; and as far as practicable aid in circulating the journal and making its value more widely known to others and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year.

N. B.—Personal attention will be called to this (as well as other notices, at times), by turning down a leaf. Extra copies mailed for 10 cents, if ordered soon enough.

PRIZES AT THE SACKETT SCHOOL.—Sackett School closed on Friday with the following award of medals and prizes: The "Hathaway" gold medal, offered by Jotham Bixby, Esq., of Los Angeles, for excellence in the study of classics, to Charles C. Stevenson, of Idaho City, Idaho Territory, with honorable mention to Richard Belcher, of Marysville. The Harmon gold medal, offered by A. K. P. Harmon, Esq., of Oakland, for excellence in the study of the English language, to James A. Crawford, of Los Angeles, a graduate in the English course of study. The second cash prize of \$5 to Frank White, of Penryn. The Haines prize of \$10, offered by J. W. Haines, of Nevada, for gentlemanly conduct in family, to Frank White, of Penryn. The prize for improvement in writing, to Master Alex. McDonald, of Oakland, with honorable mention to Frank Owen, George Brown and Harry Burdick. Prizes in spelling, to Henry Myers, of Courtland, and Henry Chauvet, of Glen Ellen, with honorable mention to Robert M. Dodsworth, of Los Angeles, on the classical course. Honorable mention was made of J. Tully, of St. Helena, Benj. Brierly, of Point Gamble, W. T., and Charles Adecock, of San Francisco. The term has been one of unusual earnestness and fidelity in study. J. M. McPherson, A. M., Professor of Mathematics in Fish University, has accepted the position of head master and teacher of mathematics in the school. He will enter upon his duties July 16th.

APPRECIATIVE.—THE MINING AND SCIENTIFIC PRESS published by Dewey & Co., of San Francisco, is one of the most valued of our exchanges. Whenever we find it on our table we naturally reach for the scissors, knowing from past experience that every fresh number contains something of general interest in any community. The last issue, containing double the amount of reading matter, was especially devoted to Arizona and its mines. In this connection we note with pleasure that Mohave county is beginning to attract that attention among mining journals which it has long deserved, but has heretofore been denied.—*Mohave County Miner*.

JUDGES AND MINERS.—The Tombstone Republican says: It is peculiarly unfortunate for people living in sections where the principal industry is mining, and where more or less litigation is constantly in progress, that judges should be sent them who, by their own admission, are totally ignorant of all law bearing upon mining cases, and wholly incompetent to render intelligent decisions. As a natural consequence, valuable mining properties are tied up, and the whole community is forced to suffer through the incapacity, or fear, of a federal judge to venture even so much as an opinion. How long, oh! how long! are we to be thus afflicted?

Our Agents

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

G. W. MCGRAW—Santa Clara county.
 M. P. OWEN—Santa Cruz county.
 J. W. A. WRIGHT—Merced, Tulare and Kern counties.
 JARVIS C. HOAG—California.
 B. W. CROWELL—Arizona Territory.
 N. H. HAFORD—Plumas county.
 M. H. JOSEPH—Eureka, Nev.
 F. W. STRATTON—Placer, Nevada and El Dorado counties.
 J. M. LEBRY—Los Angeles, San Bernardino and San Diego counties.
 A. C. KNOX—Oregon and Washington Ter.
 M. D. SHRAEDER—San Mateo county.

ORE PULVERIZER.—The rotary ore pulverizer, advertised in another column as for sale by Mr. Heald, has been used but very slightly, and is a bargain to any one in want of such a machine. It is only sold because the company which ordered it is dissolved, and there is no possible use for it. All the necessary gearing, frame, etc., go with the pulverizer, which can be set running in half an hour after it is received. Parties needing something which will grind ore fine, will do well to communicate with Mr. Heald concerning this machine.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

ROCK DRILLS. "CLAYTON" IMPROVED MINING PUMPS. AIR COMPRESSORS. For CATALOGUES, ESTIMATES, Etc. Address, CLAYTON STEAM PUMP WORKS 45 & 47 York St., BROOKLYN, N.Y. (Near Approach to New York & Brooklyn Bridge.)



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Exploration of Mines After Accidents.

In last weeks Press we had something to say on this subject and now copy the following from *Iron*: Mr. W. Howard, of Chesterfield, the secretary of the Chesterfield and Derbyshire Institute of Mining, Civil, and Mechanical Engineers, referring to the circular addressed by the Home Office to owners of coal mines and others interested in coal mine operations throughout the kingdom, states, in a letter to the *Times*, that the government recommendation of "the creation in mining districts of stations where the Fless apparatus should be stored in sufficient numbers and maintained in readiness for immediate use, and where the instructions for men from the surrounding coal mines in its use should be systematically carried out," was brought before a meeting of the Chesterfield and Derbyshire Institute of Mining, Civil, and Mechanical Engineers on April 14, by Mr. Jackson, the managing partner of the Clay Cross Collieries, and that the required organization will be at once taken in hand under the auspices of that institute. Mr. Howard adds: "It is satisfactory to be able to add that the first use of the Fless apparatus in a coal mine was at Netherseal Colliery in this (the Midland) district, in the beginning of 1881, its use on a more extensive scale at the Seabam Colliery being later, viz., in June 1881, and at Killingworth Colliery in April 1882. It is probable that the organization of the St. John Ambulance classes, first taken up, in connection with mining, by the same institute, and now in operation here at most of the collieries, may be extended to training in the use of the Fless apparatus. Another invention (Libin's firelamp and escaped gas indicator) has within the past fortnight and for the first time in this country been subjected to trial at Chesterfield by myself, in concert with Mr. C. E. Jones, of the Chesterfield Gasworks. The trials extended over three days, and were in part witnessed by the chief and assistant government inspectors of mines for the district and about twenty managers of the leading collieries, including Staveley, Clay Cross, Eastwood, Blackwell, Sheepbridge, Riddings, Pinxton, Unstone, Boythorpe, Albert, Alma, Pilsley, and Tinsley Park. The result showed that, compared with the Davy safety lamp—still almost universally used in searching for firedamp in mines—the Libin indicator denotes a less percentage either of manufactured gas or of firedamp than the lamp. This was proved first by exact and thoroughly diffused mixtures of ordinary lighting gas with air, three per cent scarcely showing in the lamp, but being indicated with perfect distinctness by the Libin instrument, at two per cent similar mixture being also indicated by the latter only. On further trial in a coal mine at Boythorpe, the lamp showed firedamp in one only of three places, in all of which the Libin instrument indicated its presence. The instrument as used in the mine on this occasion was connected with a small electric battery carried in a waist belt, and connected by wires with a bell; by a sliding contact arrangement no spark was given off. In this form it can be employed for examining any place in a mine that can be examined with a safety lamp. For positions in which it can be permanently fixed, it is designed to communicate and keep up intelligence of the state of the main return airways to the manager's office. In both forms, fixed and portable, but chiefly in the former, there are wide fields for its use elsewhere than in mines, particularly for the detection of gas in coal bunkers on board ship, and in buildings. On board ship, especially, at different points among the cargo, where safety lamps cannot be introduced, the automatic registration of several Libin's detectors, each having a separate wire and indicator, and employed either separately or together with similarly equipped thermometers, would denote the place, degree, and extent of danger. Such warnings would, of course, suggest means of remedy in each particular instance, and ultimately, it may be expected, would lead to better methods of stowing and ensured safety."

BAKER'S MINING HORSE POWER HOIST.—When a man first begins to open up his claim an ordinary hand windlass does very well. But, when he gets down fifty feet or so he begins to think he has a pretty good job on hand, hoisting by hand, and looks about him for some better means. Steam is too expensive and the ordinary horse whim too clumsy and bothersome—an appliance which in its crudity is more trouble than it is worth. An efficient and practical machine is now made by the Pacific Iron Works, of San Francisco, and at their branch works in Chicago, which just fits in this period of development of the mine. This is the "Baker Mining Horse Power Hoist." The machine is strong and simple so that any one can manage it, and a horse does the work. The following are some of its advantages: It is made entirely of iron, and is, therefore, very durable and not affected by climatic changes; no piece weighs more than 250 pounds, thus admitting of its being packed on mules to otherwise inaccessible localities; the hoisting drum is under the complete control of the man at the shaft, and is capable of carrying 500 feet of five-eighths steel rope; a pulley may be placed upon the end of the drum in such a way that a pump can be run continuously without interfering with the hoist; at the ordinary speed of a horse a thousand-pound bucket of ore can be raised at the rate of 120 feet per minute; the cost of erection is slight, as two men in half a day are able to put it in place ready for work.

One Guilty Man Who did not Escape.

We wish to put it upon record as prominently as possible, that one man who proved recalcitrant to a public trust and plundered the public treasury, has received his deserts at the hands of a court of justice. So many thieves have escaped, so many plunderers have failed of punishment, that people have almost despaired of justice, and criminals have looked upon large stealings as eminently safe spoils. That a decision has been reached, and a sentence passed which consigns a public plunderer to a common criminal's cell is a matter for general satisfaction. It will have a most wholesome effect upon the behavior of other men in places of trust; it will spread the impression that honesty in office is as necessary as honesty in private life, and that dishonesty is just as dangerous.

To show that we have a judge who can take an old-fashioned view of official corruption and that there are most cogent reasons for severity with public offenders, we give below the address of Judge Crane, of the Alameda County Superior Court, in pronouncing a sentence of fourteen years in the State prison against Kay, the county treasury thief. He said:

Maro P. Kay, you have been convicted by your own confession of guilty of the crime of forgery. The forgery consists in forging a county warrant for a not very large amount, it is true—\$76. This crime has always been looked upon in law as one of the most dangerous that could be committed against the peace and good order of society. It strikes at the foundation of all confidence between man and man, and destroys all confidence in the integrity of public officials. In addition to having committed the simple crime of forgery—which, under the English law, and until a late period, was punishable with death—you have added to it the enormous offense of betraying a sacred trust. Among all your fellow-clerks you were selected as the Deputy Auditor of this county. As such you held the keys to the treasury, and were authorized to draw orders in the name of your principal, on the county treasury for any sums for which they might properly be drawn. This trust you have basely betrayed. It has not even the excuse of a crime that has been committed under circumstances of temptation, or in the heat of passion, or under an excitement, or under the pressure of want. So far as it appears, you were amply provided for, so far as salary was concerned. You had no need of this money for any legitimate purpose. Indeed, there has been no circumstances of extenuation shown to the Court. It is simply, barely and only the fact that you were the trusted, confidential deputy of your principal, and that you deliberately, and without any apparent motive or cause, other than the commission of crime for your own gain, have committed this forgery for which you have been arraigned, and of which you have pleaded guilty. Now, while the object of the law is reformatory so far as the criminal is concerned, it has another object in view, and that is, that justice shall be dealt out to those who offend. This justice must be in proportion to the enormity of the offense and must be such as to deter others who may be disposed to commit a like crime. We can conceive of no possible mitigation in law, looking at the face of this offense. Every portion of it seems stamped with the enormity of crime of the worst guise—of deliberate, preconceived, cool, calculating crime. We do not think, therefore, that in the discharge of our duties, as the guardians of the public peace, and as the administrators of justice, we should be justified in inflicting a light or even a mitigated sentence for a crime of such enormity. If our public officials cannot be trusted, if those who are placed in places of confidence cannot be relied upon, what reliance is to be placed upon those who are not in such positions? You have not even the excuse of being ill-informed. You are educated—you have greater light than an ordinary criminal has—and therefore are more accountable. Now, under all the circumstances of the case, the Court have come to the conclusion, and we have done it deliberately and in view of vindication of the law and the ministration of justice, that the crime deserves the severest punishment which the law can inflict; and now the painful duty only remains of announcing the conclusion in regard to the sentence, to which the Court has come, and that is that you, for this crime of forgery of which you have pleaded guilty, be confined in the State prison for the term of 14 years.

We trust these weighty words will be duly pondered, and will have due influence both to warn those who may be tempted and to awaken those who are prone to sympathize with dishonest officials to the fact that a sin against the people is really an outrage greater than the coarse deeds of low thieves, and should not be condoned or excused. Let Judge Crane's sentence be also an inspiration to the people; a surety that it is not the true province of the law to prepare for the escape of the large villains and the punishment of the little ones, but that the punishment is to be commensurate with the crime committed or the trust betrayed.

NERVOUSNESS, debility, and exhausted vitality cured by using Brown's Iron Bitters.

SUFFER

no longer from Dyspepsia, Indigestion, want of Appetite, loss of Strength, lack of Energy, Malaria, Intermittent Fevers, &c.

BROWN'S IRON BITTERS never fails to cure all these diseases.

Boston, November 26, 1882.

BROWN CHEMICAL CO.

Gentlemen:—For years I have been a great sufferer from Dyspepsia, and could get no relief (having tried everything which was recommended) until, acting on the advice of a friend, who had been benefited by BROWN'S IRON BITTERS, I tried a bottle, with most surprising results. Previous to taking Brown's Iron Bitters, everything I ate distressed me, and I suffered greatly from a burning sensation in the stomach, which was unbearable. Since taking BROWN'S IRON BITTERS, all my troubles are at an end. Can eat any time without any disagreeable results. I am practically another person. Mrs. W. J. FLYNN, 30 Maverick St., E. Boston.

BROWN'S IRON BITTERS acts like a charm on the digestive organs, removing all dyspeptic symptoms, such as tasting the food, Belching, Heat in the Stomach, Heartburn, etc. The only Iron Preparation that will not blacken the teeth or give headache.

Sold by all Druggists.

Brown Chemical Co.
Baltimore, Md.

See that all Iron Bitters are made by Brown Chemical Co., Baltimore, and have crossed red lines and trademark on wrapper.

BEWARE OF IMITATIONS.

DEWEY & CO.

SCIENTIFIC PRESS

AMERICAN AND FOREIGN

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CAREFUL MAILING.—We take all possible care to mail our papers prompt and correct, and we seldom hear of complaints in its postal delivery; yet we would thank any subscriber, who may happen to miss a copy, to send us at once a postal card, giving full address and the date of the number missed, and we will remit them.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

Seaton Gold Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Drytown, Alameda County, California.

NOTICE.—There are delinquent upon the following described stock, on account of Assessment No. 2, levied April 10, 1883, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Scott, E. A.	4	10	\$ 75
Warner, Alex.	5	10	75
Martin, A., Trustee	6	5,000	375 00
Martin, A., Trustee	7	5,000	375 00
Martin, A., Trustee	8	5,000	375 00
Martin, A., Trustee	9	5,000	375 00
Martin, A., Trustee	10	1,000	75 00
Martin, A., Trustee	11	1,000	75 00
Martin, A., Trustee	12	1,000	75 00
Martin, A., Trustee	13	1,000	75 00
Martin, A., Trustee	14	1,000	75 00
Martin, A., Trustee	15	1,000	75 00
Martin, A., Trustee	16	1,000	75 00
Martin, A., Trustee	17	1,000	75 00
Martin, A., Trustee	18	1,000	75 00
Martin, A., Trustee	19	1,000	75 00
Martin, A., Trustee	20	500	37 50
Martin, A., Trustee	21	500	37 50
Martin, A., Trustee	22	500	37 50
Martin, A., Trustee	23	500	37 50
Martin, A., Trustee	24	500	37 50
Martin, A., Trustee	25	500	37 50
Martin, A., Trustee	26	500	37 50
Martin, A., Trustee	27	500	37 50
Martin, A., Trustee	28	500	37 50
Martin, A., Trustee	29	500	37 50
Martin, A., Trustee	30	1,000	300 00
Martin, A., Trustee	31	300	67 50
Davis, John A.	32	20	6 75
Martin, A., Trustee	33	5,000	375 00
Martin, A., Trustee	34	5,000	375 00
Martin, A., Trustee	35	5,000	375 00
Martin, A., Trustee	36	1,000	307 50
Kellogg, C. W.	37	100	7 50
Martin, A., Trustee	38	5,000	375 00
Martin, A., Trustee	39	5,000	375 00
Martin, A., Trustee	40	5,000	375 00
Martin, A., Trustee	41	5,000	375 00
Martin, A., Trustee	42	5,000	375 00
Martin, A., Trustee	43	10,000	750 00
Fischer, Bertha C.	44	100	7 50
Cornwall, P. B.	45	4,800	366 75

And in accordance with law, and an order of the Board of Directors, made on the 10th day of April, 1883, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at 528 California St., Room 6, San Francisco, Cal., on TUESDAY, the 5th day of June, 1883, at the hour of 1 o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expense of sale.

A. MARTIN, Secretary.

OFFICE—Room 6, 528 California St., San Francisco, California.

NOTICE!

The annual meeting of the **GAGNER MINING COMPANY** will be held on the **FIFTH** day of **JUNE**, 1883, at 126 Kearny Street, Room No. 11.

CEO. R. WILSON, Secretary.

Carson and Colorado Railroad.

(NARROW-GAUGE.)

The Company announce the completion of its line March 1, 1882, to CANDELARIA, Columbus Mining District, Esmeralda Co., Nev., 188 miles from Mound House (Union with Virginia and Truckee Railroad).

STAGE CONNECTIONS.

At Hawthorne with U. S. Stage Company's daily coaches for Aurora (26 m.); Bodie (37 m.); Lundy and Bridgeport. At Luning (125 miles from Mound House) with Gilmer, Salisbury & Co.'s tri-weekly stages (leaving Tuesday, Thursday and Saturday mornings) for Grantsville, Belmont and Tibo.

At Belleville (150 miles from Mound House) with Belleville and Independence Stage Co.'s stages for Benton (40 m.), Bishop Creek, Big Pine and Independence. At Candelaria, with U. S. Stage Co.'s stages for Colusa (8 m.), Silver Peak, Montezuma, Alida Valley, Gold Mountain, etc.

THROUGH TICKETS

To the above points for sale at San Francisco, Sacramento, Reno, Carson and Virginia E. R. Ticket offices.

This is the direct and natural route for Passengers and Freight, to points in Southern Nevada, Mono and Inyo counties, California. The line, laid with steel rails and redwood ties and equipped with new and first-class rolling stock, is a penetrating new and most promising Mining District which are now attracting deserved attention throughout the country.

For information on through freight rates apply to
H. M. YERINGTON, D. A. BENDER.
Gen'l Supt. Gen'l Freight & Pass. Agent
Carson, Nev.

Books for Miners and Millmen.

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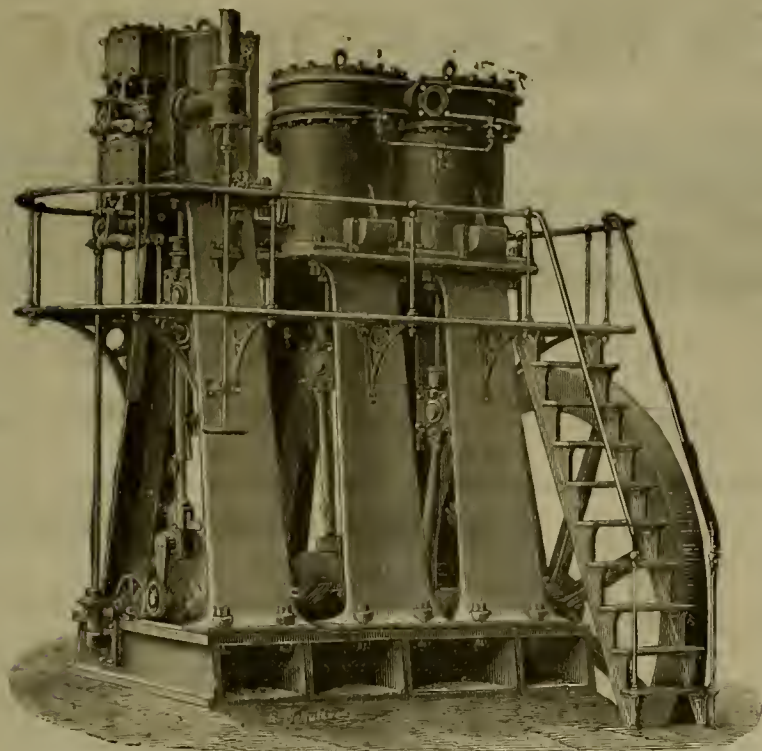
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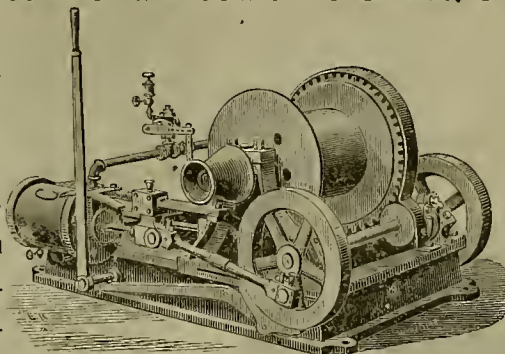
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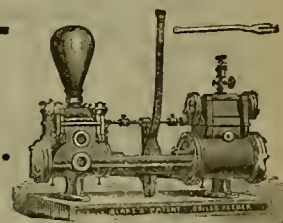
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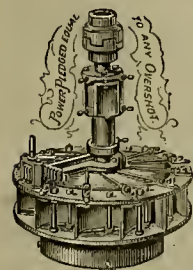
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Comprising the **Largest** and the **Smallest** Wheels, under both the **Highest** and **Lowest** head used in this country. Our new Illustrated Book sent free to those owning water power.
Those improving water power should not fail to write us for **New Prices**, before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

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(Successors to MOREY & SPERRY.)

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Mine and Mill Machinery

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MOREY'S IMPROVED PULVERIZER,

For WET or DRY Crushing.

SIMPLE, EFFICIENT and DURABLE.

The Balls revolve **Horizontally** without friction. 5 ft. size, weight 7,000 lbs., and does more work than 15 Stamp, 3 ft. size, weight 3,000 lbs.
Concentrating Mills, Rock Breakers, Amalgamating Pans and Separators, Roasting Furnaces, Hoisting and Pumping Machinery, Engines and Boilers, any size required, Hydraulic Giants and Pipe, Ore Cars, Ore Buckets, Safety Cages. The Hard Power Two-stamp Mill weight 250 lbs. THE EUREKA WIRE ROPE TRAMWAYS, Concentrating Rifles for Mills and Hydraulic Sluices.

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STEEL SHOES and DIES for Stamps, and Mine and Mill Supplies. Agents for IMLAY ORE CONCENTRATOR and the MINERS' HAND ROCK DRILL. Information and Estimates cheerfully given. Send for Catalogue.

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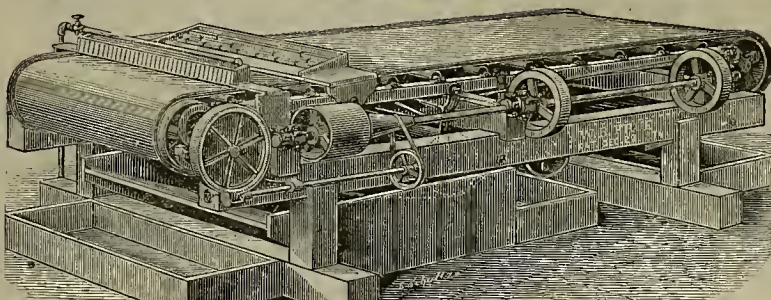
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Over 400 are now in use, giving entire satisfaction. Saves from 40 to 100 per cent. more than any other Concentrator in use, and concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order, and ready to make tests, at the office of Hinckley, Spiers & Hayes, 220 Fremont Street.

To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,

Room 7, 109 California Street,

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Nov. 6, 1882.

Send for Catalogue and Prices.

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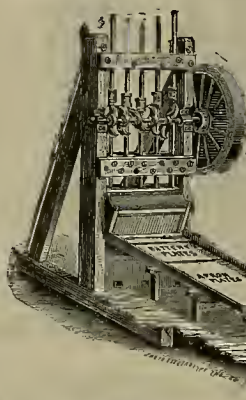
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This is no new, patent, non-explosive Safety Powder, but the Genuine Standard Nitro-Glycerine Powder, as safe to use and handle as any other Nitro-Glycerine Powder manufactured. The fumes and gases, common in nitro-glycerine powders, are destroyed, and do not leave the miner with headache or nausea.

The powder is put up in cartridges of any size to suit the consumer, and is exploded in the same manner as all other high explosives; that is, by means of cap and fuse, or by electricity. It is not claimed for this powder that it is a non-explosive, or safer than other nitro-glycerine powder. All powder, and especially nitro-glycerine powder, should be handled carefully. The EXCELSIOR POWDER is as safe, and for strength far surpasses any other powder on the market. Address all orders to

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Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of the Mining and Scientific Press, San Francisco, at favorable rates.

FLOURNOY'S ANTI-SCALE COMPOUND FOR STEAM BOILERS.

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The building has been enlarged and refitted. The next session will commence July 25d. For catalogue, address

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Nineteen miles from Calistoga, Napa County, five miles from Middletown and ten miles from the Great Geysers, between which and Anderson's Springs there are good wagon roads.

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SAN FRANCISCO, SATURDAY, JUNE 2, 1883.

VOLUME XLVI
Number 22.

Improved Postal Scale.

We present on this page drawings of an improvement on postal scales, recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, which embraces some new and novel features designed to expedite the operation of weighing letters and other mailable matter. This is done by the apparatus instantly showing the number and value of rates or stamps required for any particular letter, package or parcel, dispensing with all manipulation of the poise and beam, and all computation in connection with the weight, number and aggregate value of the stamps. It will be seen from the drawing that the operation for determining the number of rates, or stamps, and their value at two, three, five and six cents, is by means of two stationary curved rests carrying, on their concave edge, graded weights and two movable curved arms, having the fulcrum, or knife edge, at the point of contact of the two sets of curves, carrying the weight pan upon which the letter or other object is placed, on which the postage is to be ascertained.

The object being placed upon the pan will depress it, and at the same time raise the arms, which successively, on their convex edge, lift the weights off the rest, through the curved slot, until an equilibrium is reached, when the hand, or pointer, attached to the arms will indicate on the index scale, the number of rates or stamps required. These numbers are found in the first series of spaces below the hand, the value of which at two, three, five and six cents will be found in the first, second, third and fourth spaces, below each number of rates. In the open space above the numbers are figures showing the weight; as they are not, however, an element in the operation of the machine, they are not embraced in the index and might, with great propriety, be omitted entirely.

When a letter or parcel is carefully placed (not dropped) upon the weight pan, very little, if any, oscillation will result; the hand of the operator should remain in position, after placing the object on the pan, to remove it the moment the index hand, or pointer, indicates the number of rates, etc. Herein consists the great saving of time, and the vast superiority of this scale or machine over all others, which we believe it is destined sooner or later to supersede.

When the machine is at rest the hand points to, or rests on, the second vertical line in the index, which represents one rate, or one-half ounce, and will not move until the weight upon the pan exceeds one-half ounce. If the excess is but slight, the hand will rest between the second and third lines. A small increase will send it on to the third line, where it will rest until the weight upon the pan exceeds two rates, or one ounce. The hand will then pass beyond the third line, and rest between the third and fourth, or on the fourth line, indicating three rates or one and one-half ounces. Under increased weight the hand will move forward, as above described, until it has passed the last vertical line in the index, indicating that the object is in excess of ten rates, or five ounces. The counter poise weight, "No. 1," is then placed in its rest upon the end of the curved arms, which will immediately return to their first position. If the weight on the pan is not in excess of eleven rates, or five and one-half ounces, the hand will remain stationary, and one rate will be added to the last on the index,

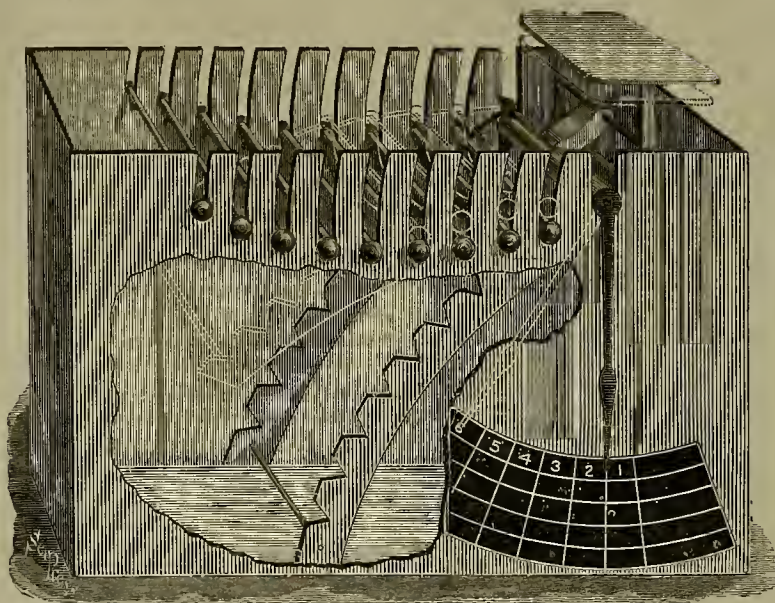
and one value at two, three, five or six cents, as the case may be, will be added to the amount in the column under ten rates.

This process of adding the number of rates and value found in the last column to the number and value of rates shown by the hand, continues until the hand passes the last line in the index, indicating that the weight upon the pan is in excess of twenty rates, or ten ounces. Weight "No. 2" will now be substituted for "No. 1," when the same conditions will follow, excepting that twice the number and value

likely to get out of order. A cover extends over the curved rests and arms protecting and preventing any derangement or displacement of the weights.

For general information, a card, furnishing valuable information on postal matters is affixed to each machine. J. Frank Miller, of Oakland, Alameda county, California, is the inventor and patentee. His address is lock box No. 1300, Postoffice, San Francisco.

COPPER. The import of copper into England



MILLER'S IMPROVED POSTAL SCALE.

found in the last column will be added to the number and value shown by the hand.

The entire absence of springs, wires or friction of any kind, and dispensing with all calculations as to number and value of stamps at any ascertained weight, and all manipulation of the poise (which, except when accidentally at the desired point, requires always two, and fre-

quently three or more moves before the weight is determined), insures the utmost accuracy and dispatch. In banking houses, insurance offices, counting houses, etc., etc., where large numbers of various sized letters, parcels, etc., are daily prepared for the mail, the machine will be of great convenience and value.

In the various post offices, where large numbers of letters, etc., have to be weighed, or tested, it will be invaluable, as it will decrease the time and labor of weighing from eighty to ninety per cent.

For mail matter, other than letters, the machine is graded at ounce rates, with corresponding values, and can, like those for letters, be made of any desired capacity. The machines are not complicated and are comparatively inexpensive.

The machine is in compact form and not

likely to get out of order. A cover extends over the curved rests and arms protecting and preventing any derangement or displacement of the weights.

For general information, a card, furnishing valuable information on postal matters is affixed to each machine. J. Frank Miller, of Oakland, Alameda county, California, is the inventor and patentee. His address is lock box No. 1300, Postoffice, San Francisco.

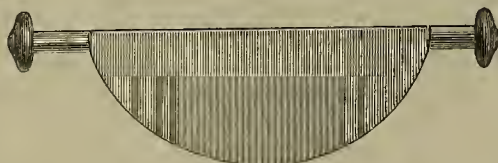
ANTIMONY is selling in England at £39 and £41 per ton for French Star regulus,

Firedamp and Gas Indicator.

Among the improved scientific instruments for mines, recently put in use, we lately described the Flens apparatus for going into mines where bad air or gas exists, giving the result of some experiments in that direction. Another invention has just been subjected to trial by Messrs. W. F. Howard and C. E. Jones, of Chesterfield, England. This is Libin's firedamp and escaped gas indicator. The trials extended over three days and were witnessed by the Chief and Assistant Government Inspectors of Mines for the district, and about twenty managers of leading collieries. The result showed that, compared with the Davy safety lamp, still almost universally used in searching for firedamp in mines, the Libin indicator denotes a less percentage, either of manufactured gas or of firedamp, than the lamp. This was proved first by exact and thoroughly diffused mixtures of ordinary lighting gas with air, three per cent scarcely showing in the lamp, but being indicated with perfect distinctness by the Libin instrument; a two per cent similar mixture being also indicated by the latter only. On further trial in a coal mine at Boythorpe, the lamp showed firedamp in one only of three places, in all of which the Libin instrument indicated its presence. The instrument, as used in the mine on this occasion, was connected with a small electric battery carried in a waist belt, and connected by wires with a bell; by a sliding contact arrangement no spark was given off. In this form it can be employed for examining any place in a mine that can be examined with a safety lamp. For positions in which it can be permanently fixed, it is designed to communicate and keep up intelligence of the state of the main return airways to the manager's office. In both forms, fixed and portable, but chiefly in the former, there are wide fields for its use elsewhere than in mines, particularly for the detection of gas in coal bunkers on board ship, and in buildings.

German Iron for Bridge Building.

The German iron works seem to furnish the best material for bridges. It is true that the prices of the German works are a little higher, but the quality is so much better that this makes no difference. The superior quality of the German material lies principally in the execution of labor, in the great exactitude of the work, and in the superior quality of material employed. In consequence, accidents like the destruction of the Tay Bridge (which call forth but little comment from the English iron papers) do not happen in Germany. The difference in the working itself is that in Germany all rivet holes are bored, but in England and America they are stamped with a stamping machine, and this method does great harm to plates, very often leaving little vents, and by experience plates are weakened 10 per cent., sometimes even 40 per cent more than by the other method. As regards the quality of the English material itself, it is very well known that it breaks if worked in a cold state. Consequently, at collisions of steamers, when the plates only ought to get bent, they are broken in, and many people lose their lives. Very often German shipowners have been reproached that they have their steamers built in foreign countries notwithstanding the fact that the German iron and steel industry can compete with that of any other country, and has the largest exportation after England. The collision of the *Cimbria* ought to be a warning not to risk valuable cargoes by saving a small amount in cost of steamers, hesitatingly rendering the lives of those, on board more secure.



WEIGHT FOR POSTAL SCALE.

CORRESPONDENCE.

Arizona Notes.

(Written for the Press by B. W. CROWELL.)

Phoenix—Salt River Valley.

This is a thriving little town of about 3,000 inhabitants, the county seat of Maricopa county, which is often called the agricultural county of the Territory. In this matter I cannot speak advisedly, as I have seen but few counties, yet as far as I have seen this compares very favorably in its apparent possibilities. Phoenix is the queen city of the valley, situated 28 miles north of Maricopa station, S. P. R. R., on the direct thoroughfare to Prescott, the capital of the Territory—124 miles north—and has the patronage of an immense freighting business, branching off in all directions from here to the various mines and cattle ranges in the distant hills. The plan of the city is thoroughly American, regular, with wide streets 100 feet for the main avenues, and 80 feet for cross streets. Every street is supplied with a clear stream on each side, running along the curb stone, and so perfect is the natural grading of the plane that it seems almost optional with the citizen which way the water shall flow.

The town was laid out in 1870, and without the aid of any manufacturing establishments except flouring mills, and no near mines or any exciting booms of speculation, it has steadily built up its present large and substantial position, as a permanent town of 3,000 population, with a full beginning for first-class American institutions. There are four churches, a large two-story brick public school edifice for the departments of graded schools, which shows the ruling vote of the community on the subject of education.

The two daily papers, with their weeklies and also another weekly published in Spanish, are somewhat indicative of the intelligence of the people of this valley. Another daily is talked as about to start, showing the confidence another editor has of the future of this town.

The population of the town is perhaps one third Spanish, but they are of the quiet, industrious class of good citizens. The county will erect its permanent public buildings here, this year, on an ample plaza provided for, in the town plot. This, with a large storehouse now building, and other improvements going on, will add materially to the town's appearance, and to the life of business here this year. But there seems to be no desire to build up the town rapidly. The large store firms now doing a thriving business care not to see any large competition come in. The banking firm of Sol. Lewis and M. W. Kales are satisfied if they can enjoy the local business as a unit. This firm lately accommodated the Territory of Arizona by purchasing her bonds of seven per cent, \$260,000, giving a premium of \$12,000 for the same.

The various mechanics seem to be well represented, and having abundance of work at remunerative prices. The main dependence of the city of Phoenix is the rich farming lands of Salt River Valley.

This valley, usually called Salt river, though it joins on and embraces a portion of rich lands, watered by the Gila, is a very extensive plain, 60 miles long by 12 to 20 miles in width. The Salt river has furnished water for numerous ditches for irrigating portions of these lands for cultivation; but still the cry is more water for irrigation, and this demand is being heeded by new ditch enterprises.

Those in the extreme west of this valley are now looking anxiously for the completion of Webb ditch, taking water from the Gila, to excellent government lands. But nearer Phoenix, about 25 miles below the city, work is now being done on another Gila river canal, under the direction of Hon. Mr. Rumburg, that will supply irrigation for miles of rich farming and grain lands on the north side of the Gila, below where Salt river joins with it. There are various natural advantages here for a large colony settlement. The land, rich and choice, with abundance of fuel on the lands, and a large amount of heavy cottonwood timber along the banks of the river. The lands are very easily cleared and easy to cultivate—a rich alluvial sand and gravel, and occasionally some little mixture of adobe. The land is now covered by arrow, sage, or grease bushes, and mesquit hard wood. Right here in this lower portion of the valley are undeveloped resources, ample to build up a good county. When I visited there a few weeks since, there were no signs of any ownership, other than United States government, their survey stakes only appearing.

The lands now occupied in the vicinity of the Phoenix and for twelve miles west and four miles north, are well watered by Salt river ditches, the river passing about two miles south of town, and the Grand canal, about four miles to the west of Phoenix. The lands lying beyond the canal could not be irrigated as they slope all toward the river for several miles. How to reach the vast table lands beyond, has been the problem, and has at last begun to be solved by

The Arizona Canal Co.

Incorporated here in Phoenix, Dec. 20, 1882, by M. W. Kales, W. A. Hancock and Chas. Churchill, with a capital stock of \$500,000, of par value \$500 each share. Work is now being

commenced, by about twenty teams and a force of men under W. J. Murphy, which after the hot harvest season is past will be increased to 100 or more teams, and as many men as are requisite to ensure an early completion for crops in 1885. The present camp will be located near the mouth of the Verde. The capacity mentioned is 40,000 inches, miners' measure. They tap the Salt river on the north bank about three fourths of a mile below where the Verde river flows into it, and where a hard bed rock bottom prevents the sinking of the waters into the sand, at a point about two miles east of Mt. McDowell, thus securing an elevation sufficient to reach the higher mesa lands and irrigate the vast tract to the north and west, not accessible by the Grand canal or other ditches.

Government Land.

It is a good place for a poor man to get a good farm on government lands. The public land is here surveyed and accessible—open plains that with wagon and horses you can drive to any portion of it, and where it is settled and cultivated there are section roads. The light bushes are easily cleared off by grubbing hoe at the rate of one to two acres per day, but with sagebrush rake and six horses they can be cleared much faster. The land is very free and easily cultivated. The merchants seem to have great faith in the cultivator of the soil, and fill their big ledgers with accounts that are to be paid after harvest. I noticed one of these bills yesterday where syrup was charged \$1.75 per gallon, bacon twenty-five cents per pound, flour \$5 per hundred pounds, and it has now advanced to \$5.50. These are high prices, but the farmer soon takes the benefit of these high prices when he sells much and buys little. The house can be built cheaply of the adobe style, with log rafters, brush and dirt and plaster roofs, that will serve till able to do better.

The Settlers from Utah

That come to this territory seem to be very poor, yet they generally have good teams and wagons and some few implements and seeds with them. They will stop and camp, or live in the wagon until they plow and put in some seeds for the first season's use, before they attempt to build any house. In a few weeks they have garden sauce of their own raising, and thus early strengthen their faith in the productivity of the soil. They fully appreciate the importance of useful occupations for all members of the family. For cash to supply needed groceries they will do some work with team, or as laborer in the adjoining settlement, and in a short time, they are all comfortably fixed, with a place of their own.

Phoenix, May 9th, 1883.

Wyoming Mines.

The mines of South Pass, Wyoming, are looking well, and give fair promise of making good showing this season in bullion product. The Carrissa property, owned by B. Rohers and H. S. Reedall of this city, has just been leased to W. W. Pitkin and Nat. Gishorn, the lease having been perfected yesterday. The mine has a large body of \$15 free milling gold ore in sight, and the lessees are in hopes that as depth is gained the ore will improve. Belonging to the property is a five-stamp gold mill, operated by water power. This mill can be doubled in capacity, the water wheel and quantity of water being ample for this, and it will probably be done. This mill is located only half a mile from the mine, hence the cost of getting ore to the mill and reducing is small, and can be further reduced by putting in more stamps, which will require no more hands to operate. Pitkin and Gishorn own the Red Jacket, lying near, on which they have done considerable work, first by sinking a shaft which tapped good ore, and at the same time struck water which drove them out. The property is so situated as to be easily drained by a tunnel. Abandoning work at the shaft, they have driven a tunnel 400 feet, and expect soon to cut the vein at a depth which will free the mine of water and give them a large ore body above. Mr. Pitkin who has been on the property a long time, and is very familiar with mines, is sanguine over the present outlook of that district, which he unhesitatingly pronounces a good mineral region. He says all that is wanted is capital and enterprise to bring the South Pass country into prominence as a gold producer.—Salt Lake Tribune.

There are at present about thirty men working in the Drum Lammun mine running cross-cuts, and sinking three inclines or winzes on the lead about ninety feet apart. The 1,100 feet tunnel is being vigorously pushed into the hill, the men working eight hour shifts. It is reported that the new mill will be erected near the tunnel. Experiments are being made on the ore by running it through the old mill in the process, a drying furnace having been improvised for that purpose. Credit is due to Mr. Cruse in developing this valuable property which is mammoth. Mr. Attwood has purchased a cozy residence and erected offices for the Montana Mining Co., of which he is the superintendent, at the foot of Cruse Mountain which has a back-ground 780 feet high and is highly picturesque.

The Christy Mill and Mining Company of Utah is credited with a bullion product of over \$1,500,000 in the past five years, as follows: 1878, \$302,537; 1879, \$245,466; 1880, \$272,085; 1881, \$316,039; 1882, \$372,426; total, \$1,508,553.

The Deep Spring Country.

Mr. P. A. Chalfant contributes to the *Inyo Independent*, an article on this region of country, from which we condense the following:

The undersigned returned late last week from a brief visit to Deep Spring mining district. This visit was not undertaken for fun, still less with the view of writing an account thereof, but solely as a personal matter, shared by Mr. Oscar Stickney, wherein the moving cause was the hope of finding some clue to the lost key of the great grub question. But, as others, perhaps quite as worthy, are looking for that same clue, it will be well to record a few observations for their benefit. It would fill a book to tell of all the mining claims bordering on Deep Spring valley; their name is legion—though they are all recorded under other names than that.

Numerous as these locations appear to be, they really represent but comparatively few distinctive ledges; as a rule, scarce a ledge but has at least two 1,500 foot claims located upon it, while there are some with not less than six. This is notably the case with one, which, for want of a better known name, is called the

Whiteman Lode.

After "old Gid. Whiteman," one of the most widely known prospectors on the coast, and also one of the original locators of the ledge in question. There are no less than six consecutive locations on this lode, besides two or more on what appears to be a branch of the same. The ledge having a plainly discernible dyke of porphyritic rock for a foot-wall, and cutting across several lateral ravines, runs northeasterly from the valley along the high ridge facing Soldiers' Pass, on its northwestern side.

The deepest of these lateral ravines cuts the ledge near the middle of its length. Scores of assays were had, and scarce one fell short of a hundred dollars to the ton, silver almost exclusively, while a fair proportion went double that, some even to \$600. Some coyote holes, the deepest not exceeding fifteen feet, were sunk on each of the several locations, and quantities of good ore, ranging from a hundred pounds or so to eight or ten tons, were extracted from all of them, the largest pile being found on the branch lode.

Certain it is that the croppings and solid rock near the surface of the vein yet retain their silver in paying quantities, as has been demonstrated time and again. For the most part, if not in its entire length, the vein cuts across the general stratification of the granite country rock. About half a mile north of this Whiteman lode is a parallel ledge, called the Gilbert, which crops out for a distance of about 1,600 feet, the southern end extending quite down into the valley. William Hedge, whose faith in this ledge and the district in general is sufficient to remove mountains, is working away upon it, single-handed and alone. Thus he has managed to get a shaft down some 25 feet. While he does not claim to have "struck it" in the full sense of all that phrase implies, he does find about three feet of ledge matter in the bottom, and interspersed through it, small quantities of rich ore, mostly black or brown oxides, but also considerable Stephanite.

Directly across the valley, on the side of the main Inyo range facing the valley, are to be found numerous claims, some of them having been located and worked twenty years ago, and with which, notably the Ciudadella, are associated some thrilling tales of the subsequent Indian troubles. Not having seen these mines, as well as dozens of others overlooking the valley on all sides, especially the west and north, all that need be said, is that so rich have several of them always shown themselves to be, that some of the very first locators are still at work upon them. The Hiskey and Walker five-stamp mill, erected in 1872, worked several months on gold ores from a number of these ledges, quite a large lot of "Blue Bird" going as high as \$625 per ton, it was claimed that this mill turned out more bullion per stamp than any other ever run in the county, nevertheless, after a few months' operation, the superior attractions of the Lida valley mines, forty miles distant, caused the removal of the mill to that place where it yet stands.

The rather lofty ridge at the north end of the valley is the division between Wynan and Cottonwood creeks, the two being some eight miles apart. The latter debouches into Fish Lake valley.

Some five miles up Cottonwood, from Piper's, and mostly on the northern face of the ridge above alluded to, are to be seen many locations. In general, these ledges are small, but yielding exceedingly rich ores, both gold and silver. This has been the scene of some thirteen years' continuous operations by Mr. O. K. Berry, the Recorder of the district. During all these years Mr. Berry has wrought, often entirely alone, sometimes in *bonanza*, sometimes in *bo-rasco*, (especially in the matter of a sufficiency of "grub"), on different ledges in the vicinity, from which, at intervals, he has shipped enough high grade ore to supply necessities, although it has happened that \$300 ore, in lots of two or three tons, barely paid shipping and reduction expenses.

Among others of Mr. Berry's locations, was one known as the "78." This he had opened in several places; the principal work was just below the summit of a narrow ridge, permitting a tunnel from the east side and a 45° incline from the croppings on the west side.

The ores generally of the district are of a

class susceptible of successful concentration, both silver and gold. It is likely that method (concentrating) will give better results than any "silver process" involving roasting and all that sort of thing. The gold ore can be worked to a pretty high percentage by battery and plates alone, but they, too, should be concentrated. The "78" mine can certainly furnish ore enough to keep a five, perhaps a ten-stamp mill going right along. There are other ledges near by apparently quite as large or larger than this, and so far as opened, no less promising. There are perhaps a hundred dumps within reach of the two creeks named, on each of which paying ore is now piled up. There is an immediate need for a small mill on each of these creeks. With such, and square and liberal dealing, Deep Spring would give profitable employment to a very large number of chloriders, saying nothing of the prospect for deep and permanent mining.

Sampling Mills.

The main business in hand by superintendents Yerington and Laws, of the Carson and Colorado, upon their present visit, is to fix upon the location on their line of two or more sampling mills, where ores can be received, sampled, bought and paid for by ore buyers. Such a "plant," consisting of a steam engine, rock breaker, small pulp mill, assay office, etc., can be established at a cost of \$2,500, and it is probable that three will be needed—at Bishop, Big Pine, or Independence, and near the lake Mr. Wm. B. Miller, superintendent of the Melrose reduction works near Oakland, accompanies the party, and will spend some time in examination of the various districts, mines and character of the ores, in furtherance of the enterprise.

In this our mine owners and prospectors, whose properties have dragged upon their hands as almost worthless, because of the absence of any way of realizing upon the ore extracted, will at once begin to see a gleam of daylight. Many old ore dumps will be cleaned out, realized upon, and new work and actual deep developments begun. The railroad managers are wisely determined that the purchasing agents shall satisfy all ore producers that their sampling is perfectly fair, and that the prices paid, by whatever works wanting the ores, shall be exactly in accordance with their true value in the metals contained. This is accomplished by the seller taking a precisely similar sample and sending it here, to San Francisco or where he pleases to acknowledged experts, for assay and comparison of results.

Now, if we want better times, let those who can and who know they have good ore, get to work and take it out. The cash therefor can be obtained at the most liberal prices consistent with safety to the buyer. These affairs will lead up to the final establishment of some great central reduction works in the valley, capable of handling any kind of our mineral products.—*Inyo Independent*.

The Wood Business of the Truckee Basin.

The wood business of the Truckee basin is no small portion of its source of wealth. As is natural in every country where sawmills abound, and lumber is made, cord wood forms a principal adjunct. Many large trees 50 to 80 feet high arc cut down from which only one good saw log, perhaps 20 feet long, or even less, can be obtained, the remainder being cut up into firewood, and not left to rot on the ground. The Central Pacific, with its large number of engines, consumes vast quantities. Carload after carload is shipped to the valley west and the country east, and piled in their woodsheds for use during the year. Something of an idea of the contribution of the Truckee basin to this demand may be gleaned by knowing that Brown furnished last season 3,000 cords; Prosser creek, 5,000; Martis creek, 6,000; Truckee, 18,000; Donner boom, 4,000; Donner lake side, 3,000; Champion's, 3,000; Kneeland's mill, 3,000—total, 45,000 cords, all of which is purchased by the Central Pacific Railroad Co. The winter of 1881 and 1882 proved a cheap one for the railroad company. The best wood is cut in the fall and winter, for the reason that the bark holds closer to the wood, and the railroad company always tries to contract for wood cut during the fall and winter months. The labor is principally by Chinamen, who receive an average of \$1.50 per cord for cutting, the wood when delivered at the track selling from \$3.75 to \$4 per cord.—*Truckee Republican*.

Some two or three years since, the agents of the C. P. R. R. looked over the coal mine at Gorse Creek, Idaho, and pronounced it good. They gave it as their opinion, that the coal very nearly resembled the celebrated brown coal of Germany. At the present time there is a party of practical miners at work in these mines, sinking shafts and tunneling; and before long it is confidently expected that one of the largest and richest coal beds in the West will be opened up, and added to the already large mining interests of the region.

The Silver City papers are justly proud of the recent strikes made near that place. They are a credit to the country and will be a substantial benefit to the town. Such discoveries cannot fail to bring New Mexico to the attention of the mining world even more prominently than heretofore.

MECHANICAL PROGRESS.

Proper Use of Belting.

The mode of applying belting in transmitted power should always be correct, because there is a great chance of loss in percentage if this is not attended to. The friction between the belt and the pulley is the source from which the power of the belt is derived, and there is a great difference between the sliding friction of the belt and the adhesion of the belt to the pulley. The latter often wastes more power than it serves to transmit, while the former confers the real power, so that in applying rosin, oil, and other adhesive substances, a good deal of power is wasted instead of helping to increase it. It requires power to tear a belt from a sticky pulley, and the amount of force required to do this is so much wasted. The friction between the belt and pulley is the whole source of power, and the coefficient of this friction will be the measure of the power of the belt.

While want of strength would render a belt useless, an increase in the strength would not increase its ability to transmit power unless the friction was increased at the same time. There are certain elements that tend to increase the efficiency in every belt, and others that detract from it. Those that increase the efficiency of every belt are the friction between the belt and the pulley, and the tensile strength of the belt, and those that tend to decrease the efficiency are adhesion; the power required to bend the belt, and the extra friction caused by the tension of the belts on the pulleys. Adhesion is found to exist most perfectly between surfaces that are coated with some semi-liquid, such as castor oil, and the least amount of adhesiveness is found between two dry substances, such as between a dry belt and a dry pulley.

The power required to bend a thick belt is greater than may appear at first sight, hence it would be better, in order to save power, to use a broad thin belt than a narrow thick one, and as it has been found that the resistance of the belt bending is inversely as the diameter of the pulley, it will always be found that large pulleys are the most economical in this respect. Experiment has demonstrated that the greatest effect is obtained when the belts are moistened with water, and the least when moistened with oil. Friction is always in proportion to the pressure, and not the amount of surface in contact; and experiments will show that two belts, one being only half the size of the other, will give an equal amount of power when the pressure is the same, but when the pressure is very slight, an increase of surface may result in an increase of friction. It has been fully proved, however, that where the pressure is excessive any diminution of the surface will cause an increase in the friction.

Compressing Bran.

Mr. Seamans, Secretary of the Millers' National Association, has been authorized to pay an award of \$1,000 to any one who will construct a machine capable of being put to practical use, which will compress 100 pounds of bran into a space equivalent to a fifteen-inch cube, which is equal to 3,375 cubic inches. The object is to bring the refuse of wheat grinding into a form sufficiently compact to make it a transportable article of merchandise.

In reply to this offer, a correspondent of the *Millers' Journal* says, "It can't be done;" to which assertion Mr. Seamans replies as follows:

"The Belt Packing Company, of Minneapolis, will pack one ton of bran in a space 6½ x 2½ x 2½ feet, which is equal to 3,375 cubic inches for 100 pounds. I have a sample in my office made by this machine, which is compressed to the rate of 3,150 cubic inches for 100 pounds. I have another compressed at the rate of 3,075 cubic inches; both are pressed dry. The party producing the latter sample says of his machine: 'My machine will compress 110 pounds in a cube of fifteen inches square, which is more than you require. My machine is very simple, easy to operate, worked by hand or power; is not expensive. Full size, nine feet high, three and a half by two feet on the floor,' etc., etc. I have letters from at least ten parties that claim to be able to fulfill the requirements. A machine is now in operation in Chicago which will not only compress dry bran to a much greater density than we require, but will compress hay and straw to the density of maple.

It will not do in this age and generation for any man or set of men to proclaim to the world that what they may not be able to accomplish is impossible. Mr. Blinn's machine may equal his ambition—be satisfactory to him—but will not help us to export our bran as at present represented to work."

AN IMPROVED BELL TELEPHONE.—M. D'Arsonval, a French electrician, has devised a new form of Bell receiver, which, for its size and weight, is claimed to be the most powerful yet constructed. According to the description at hand, the chief modification consists in inclosing the hobbin entirely between the poles of the magnet, this being done by making one pole of the magnet the core of the hobbin, and the other pole an inclosing ring of iron. The inductive plate vibrates over the poles and upper surface of the coil as before. The complete instrument is said to weigh only a little over five ounces, and to be as powerful as the heavy flower-Bell receiver.

Manufacture of Machinists' Tools.

The state of business among the manufacturers of machinists' tools indicates the industrial prosperity of the country with almost unerring exactness, at any given time. Are the times good? Is business booming? Is money plentiful? Then we may know that railway securities are easily negotiated, and that money is available for railroad extensions and renewals. The mechanical industries in all their departments, equally feel the impetus of a new life. Shops for construction and repairs are wanted, either on a larger scale or in new locations, and at once orders pour in upon those who furnish lathes, planing machines, steam hammers, punching and shearing machines, drills, etc.

Of late, tool manufacturers complain that orders for new work come in very slowly, so that the ordinary force of men can be retained in employment only as they may have yet in hand old orders partially executed. This sluggish condition of things is felt by the largest and most popular and prosperous concerns, as well as the rest. In a notable instance the decline is something like fifty per cent, compared with "flush times" which have gone. The falling off is not confined to any one or more of the leading specialties, such as locomotive building, but all branches of mechanical enterprise seem to be affected. It is observed, however, within a few days, since the decline in the standard grades of iron, and since the return of ease in money, that enquiries are more frequent, encouraging hopes of better times ahead. The present, if a period of uncertainty, is also a period of expectation, from which, it is hoped, all grounds of doubt will soon be eliminated. The question of cheaper iron may be the pivotal point upon which the issue turns. At least, it is well known that large contracts for steel rails and other materials are held in abeyance, to await the course of events in the immediate future. A more general movement of the various products of agriculture, such as naturally attends the resumption of internal navigation, and especially a more confident assurance of abundant crops from the approaching harvest, or from seed now going into the ground, may suffice to inaugurate a brighter day.

LARGE STEEL CASTINGS.—Owing to the rapid and very extensive growth of the manufacture of Siemens steel in Scotland, there has of late been somewhat extraordinary demand for large anvil blocks, and during the past few weeks two of immense size have been cast. Referring to these, our contemporary, *Engineering*, says that up till now there has not been many anvil blocks in Scotland weighing more than 140 tons, but recently one was cast at the Dalziel Steel Works which is said to contain 170 tons of metal. There is also in progress at the steel works of the Govan Forge and Steel Co., Glasgow, an anvil block which is estimated eventually to contain about 165 tons of metal. In both cases these anvil blocks are intended for use with twelve-ton steam hammers, of which there are now several in regular work in Scotland. The Govan anvil block will be in two pieces, the larger of which, weighing about 140 tons, was finished a short time since. It was cast in a mold occupying the position which the block will occupy after it has been slightly cooled and canted over upon its proper base. The other portion, which will form the top piece of swage-block, and weigh about twenty-five tons, will be cast in a short time. The mixture used in the anvil blocks under consideration was about one quarter No. 3 Gartscherrie and three quarters scrap cast iron.

TESTING SCALES.—The new testing scales in use at the office of the local Inspectors of Steam Vessels of this city are the most accurate ever invented. It is used to test the strength of the iron to be used in the construction of steam boilers, and has a testing capacity of 76,000 pounds. The metal to be tested is firmly grappled, and the powerful double fulcrum lever is made by one man to exert its ponderous power, dragging the strongest steel asunder like molasses candy till it snaps. A self-acting marker moves over the horizontal scale-beam by a system resembling clockwork, and denotes the gradual amount of power applied, and stopping instantaneously with the breaking of the iron tested, gives the accurate test. All of the tested samples are carefully tagged, showing the test applied and for what boiler intended, and kept in boxes for future reference, as, for instance, when a boiler bursts, its strength of material may be officially ascertained.

CALIFORNIA MECHANISM.—Drawings of the new locomotive "El Gobernador," now being built at the Sacramento shops, and which will be the largest locomotive in the world, will be sent to the Chicago exposition of railroad appliances. Master Mechanic A. J. Stevens, of the Sacramento shops, will also send a model of his improved valve motion for locomotives, which, it is claimed, will effect a saving of thirty-three per cent in steam.

A NEEDED INVENTION.—The Philadelphia *Press* says: "The man who can inform the United States Government, before July 1st, the best way to destroy the printed revenue stamps in the bank check-books without destroying the check blanks, may possibly hear of something to his advantage by communicating with Secretary Folger."

SCIENTIFIC PROGRESS.

Improvements in Secondary Batteries.

In a report upon an improved form of the storage battery lately made by Prof. Henry Morton, he found that one cell containing 16 plates, whose united weight was 48 pounds (and with lead-lined box and liquid included, 80 pounds), when fully charged would yield a current of 32.3 amperes at the beginning and 31.2 amperes at the close of a continuous discharge for nine hours. The current supplied by 50 such cells connected in series, will suffice to run 44 Edison incandescent lamps for nine hours. If fewer lamps are used with the same battery, they would be operated of course for a proportionally longer time. Thus 11 lamps would be supplied by a 50-cell battery for 36 hours continuously; or, as lights are commonly used in private houses on the average for 5 hours each night, such a battery once charged would operate 11 lamps for a week. To express the relation between weight of battery and power, it may be said that for each lamp operated for 9 hours, 11.7 cells of battery would be required, or a weight of about 90 pounds of battery. This would be, for each hour of burning each lamp, 10 pounds of battery.

As compared with the recent experiments on the Faure storage battery, made by M. Tresca at the Conservatoire des Arts et Metiers, in Paris, these results show a decided superiority. Thus, in Tresca's experiments a cell weighing 95 pounds yielded a current representing 793,791 foot-pounds of energy; whereas the results obtained by Morton with the new battery weighing but 80 pounds, represented a yield of 1,826,168 foot-pounds. This, in comparison with the yield of the Faure battery, exhibits more than twice the energy with one-fifth less weight.

As respects the efficiency of this new battery in delivery—that is, the amount of current given as compared with that used to charge them, the results are reported by Prof. Morton to be remarkably good. He reports, in other words, that he is able to obtain from these batteries 90 to 91 per cent of the current used to charge them, which greatly exceeds the results obtained by Tresca with Faure's batteries, who reports a loss in charging and discharging of 40 per cent; and Messrs. Perry and Ayrton, who make the loss 18 per cent.

Lastly, on the important question of retaining the charge during a long time, Morton reports that he charged three cells and locked them in a closet on February 1st, and allowed them to remain until February 16th, when he commenced discharging them at the rate of 32 amperes, continuing this rate of discharge on the next day. He thus obtained 260.7 ampere-hours of current. Comparing this with the 286.5 ampere-hours of current obtained from three other cells which he discharged soon after charging them, the result shows a loss of only seven per cent in standing unused and charged over sixteen days.

These experimental results appear to indicate a decided advance in practical efficiency for these batteries.

SCIENCE AND RELIGION.—A long and very able review of the new book, "Where, What, Where?" appears in a recent number of the *Chicago Times*, in which the writer regards the book as a pioneer in the desirable work of "harmonizing science and religion." We have never felt that there were any antagonisms between *exact* science and *true* religion. Speculative science and speculative religion will always be at loggerheads, and the contest can have but little interest to the thoughtful and observant. When the indefensible dogmas which now embarrass and distort both religion and science are eliminated, it will be seen how impossible it is that *truth* can antagonize itself. The most thoroughly scientific man must by the influence of knowledge be the most religious, and so the religious man must be upheld and supported by science. The trouble is, that men of research, students in science and theology, are biased by theories and speculations, and by unwarrantable dogmas. Science teachers presume to tell us what is possible and what is impossible; religious teachers, what we must believe, and what we must not believe. The material and spiritual insight is clearer to-day than it was yesterday, and the next century will witness advances, the magnitude and beneficence of which we can scarcely now conceive of.—*Popular Science News*.

THE ELECTRIC LIGHT IN PARIS.—It is not uncommon to meet in our streets peddlers of kerosene going from house to house vending their illuminating fluid from a can. In Paris the electric stored light is carried about the streets like kerosene here, and it is said to have become a favorite way of illuminating houses on social and official occasions. The accumulators are carried in a vehicle, which is stationed in front of the house, and electric wires are conducted into the building through the windows. Incandescent lamps are placed in the ordinary candelabras, and the fitting of the most complex lighting is an affair of but a very short time.

SIRE'S PENDULUM.—M. Sire has presented to the French Academy a modification of Foucault's pendulum, which accurately exhibits the laws of displacement in whatever latitude the experiment may be tried.—*Comptes Rendus*.

An Interesting Discovery.

According to a French paper, the *Echo du Nord*, a number of coal mines in the north of France are about to be visited by a band of explorers of great distinction. Messages were recently sent from the place in question to the Academy of Sciences, in Paris, and to the authorities at the British Museum, inviting delegates from each of the bodies to pay a visit to the subterranean passages, where an uncommon discovery is said to have been made. The paper in question relates how, in excavating a new passage, the miners came across some extraordinary fossils, proving the presence there, at some remote period, of human beings, as well as of animals and fishes. The passage in question led, as it appears, into two caverns, the mouths of which have long been closed up, and in the first of these were discovered five perfect fossils—one of a man, two of women and two of children, besides several weapons and utensils of petrified wood and stone. The second cavern, discovered some time later, contained no less than eleven fossil bodies, described as being of large dimensions, a quantity of miscellaneous objects, and some precious stones. In addition to this, it is ascertained that the walls of the cave were covered with rude sketches representing the combats of men with gigantic animals, from which it would appear that the human race, while battling for existence with the aid of stone axes against the monsters of the field and forest, were still acquainted with the graphic arts, and anxious to perpetuate their deeds of early heroism. The bones and bodies themselves have now been removed to the neighboring towns of Lens and Lille, in the latter of which places they were recently exhibited.

A NEW PROJECTILE.—Mr. J. D. Cable, of Pittsburg, Pa., has applied for letters patent for a shell which, as a destructive weapon, is claimed to be unequalled. It is a nitro-glycerine bomb, and is described as follows: A heavy conical shell is first cast, and so arranged that one end is much heavier than the other. One end is closed with a tightly-fitting cap screwed on after charging. The interior of the shell is divided into three compartments, each separated by a heavy plate-glass cap. The division furthest from the open end is filled with sulphuric acid, the next with glycerine and the outer one with nitric acid, these three elements being the component parts of nitro-glycerine. A small opening through the center of the cap fitting the open end of the projectile admits a steel rod, to each end of which is firmly attached a small circular piece of metal, the inner end resting against the first glass cap. The outer cap is then screwed on and the projectile is ready for service. According to the principle of gravitation the heavy end naturally strikes the ground first, the steel rod is driven through the plate-glass partitions, the chemicals are mingled and a nitro-glycerine discharge takes place. The inventor claims that if such a projectile should strike a vessel it would have a disastrous effect, and as a means of reducing intrenchments it would be serviceable beyond measure.

MAGNETIZATION OF IRON AND STEEL BY RUPTURE.—At a recent meeting of the Society of Physical and Natural Sciences, at Karlsruhe, Germany, Mr. Bissinger dwelt at some length upon the phenomenon of magnetization of iron and steel when broken in the testing machine. The phenomenon is ascribed not to the elongation of the bar, but to the actual fracture, and both parts are converted into two magnets of sensibly equal power. The shock and vibration of the metal on breaking, is in all probability the cause of magnetization. In testing bars for tensile strength, the south pole is formed at the upper end of the bar, and it has been found that the different iron objects near the machine at the moment of rupture are also magnetized, but to a less degree.

AN OLD STORAGE BATTERY PATENT.—Electricians are interested at present in the discovery in the Patent Office of a patent issued February 6, 1861, to C. Kilchof, a New Yorker, for an electric battery, which presents all the features of the storage batteries in use at the present day—lead plates immersed in acidulated water, which becomes coated with the oxide of lead. The principle appears to be the same as that of the Plante (French) storage battery, and the storage batteries now in market must hereafter rely upon peculiarities of construction instead of comprehensive claims.

THE GEOGRAPHICAL SOCIETY.—At a meeting of the geographical Society of this city last week, J. C. Flood was made an honorary member. A lengthy paper was read by G. P. Lansing, on "The Influence of Early Arabian Inter-course with China." The essayists had grouped together a large number of facts bearing on the interesting theory that Europe owed most of its early progress in arts and sciences to the centuries of commercial intercourse between the Arabs and Chinese; the former thus introducing the latter's civilization into Europe.

STILL ANOTHER NEW THERMOMETER.—Prof. Tait announces that by means of pure iridium and ruthenium he has been enabled to construct a standard thermo-electric thermometer, capable of reproduction anywhere, and which would afford a perfectly definite standard for the comparison and measurement of high temperatures, for which at present no proper instrument exists.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T SALE.	SECRETARY.	PLACE OF BUSINESS.			
Alhambra M Co.	Nevada.	16.	7.	May 7.	June 11.	July 2.	F J Schwarz.	324 Washington st	
Alta S M Co.	Nevada.	25.	25.	Apr 10.	May 15.	June 11.	J W Watson.	302 Montgomery st	
Belle Isle.	California.	5.	10.	May 16.	June 19.	July 10.	J W Pew.	310 Pine st	
Benton Con M Co.	Nevada.	10.	10.	May 26.	July 2.	July 10.	W H Watson.	302 Montgomery st	
Best and Belcher M Co.	Nevada.	20.	20.	May 8.	June 13.	July 3.	W Willis.	309 Montgomery st	
Belcher M Co.	Nevada.	32.	25.	Apr 21.	May 24.	June 12.	J. Crockett.	327 Pine st	
Belmont M Co.	Nevada.	7.	25.	Apr 30.	June 4.	June 25.	C C Harvey.	309 California st	
Bodie T and M Co.	California.	7.	25.	May 1.	June 4.	June 25.	C C Harvey.	319 California st	
Bullion M Co.	Nevada.	27.	20.	May 7.	June 11.	July 5.	J M Brazell.	328 Montgomery st	
Continental C & I Co.	Contra Costa Co.	1.	5.	May 26.	July 5.	July 24.	W E Greene.	309 Montgomery st	
Con Amador.	California.	5.	50.	May 17.	June 21.	July 11.	F B Latham.	408 California st	
Campo Seco Copper M Co.	California.	1.	5.	Apr 27.	May 31.	June 20.	D Buck.	309 Montgomery st	
Con Imperial M Co.	Nevada.	19.	5.	May 2.	June 8.	June 27.	W E Dean.	309 Montgomery st	
Day S M Co.	Nevada.	12.	30.	Mar 12.	Apr 26.	May 21.	E M Hall.	327 Pine st	
Forekna Con M Co.	Nevada.	4.	100.	May 21.	June 21.	July 16.	P Jacobus.	309 Montgomery st	
Hope Con M and M Co.	Nevada.	2.	5.	May 2.	June 6.	June 25.	F S Monroe.	304 Montgomery st	
Independence M Co.	Nevada.	11.	30.	May 25.	June 23.	July 23.	J W Pew.	310 Pine st	
Julia Con M Co.	Nevada.	15.	10.	Apr 10.	May 14.	June 4.	H A Charles.	419 California st	
Lady Washington M Co.	Nevada.	3.	6.	Apr 21.	May 21.	June 13.	W H Watson.	302 Montgomery st	
Mc Auburn M Co.	California.	11.	20.	May 25.	June 27.	July 16.	J H Wilkins.	438 California st	
North Belle Isle.	California.	6.	20.	May 10.	June 2.	July 12.	J W Pew.	310 Pine st	
Napoleon M Co.	California.	7.	10.	Mar 13.	May 10.	May 31.	H G Smith.	307 Montgomery st	
Ophir M Co.	Nevada.	44.	50.	Apr 26.	June 1.	June 21.	C L McCoy.	309 Montgomery st	
Potosi M Co.	Nevada.	12.	25.	May 17.	June 20.	July 11.	W E Dean.	309 Montgomery st	
Red Hill Hydraulic M Co.	California.	8.	5.	May 24.	June 27.	July 23.	E Hestres.	328 Montgomery st	
Sunmit M Co.	California.	10.	01.	Mar 16.	Apr 30.	May 25.	R N Van Brunt.	318 Pine st	
Union Con M Co.	Nevada.	22.	50.	May 2.	June 6.	June 25.	J M Bufington.	309 California st	
Utah S M Co.	Nevada.	44.	100.	May 16.	June 20.	July 9.	G C Pratt.	309 Montgomery st	
Wales Con G and S M Co.	Nevada.	1.	25.	May 14.	June 15.	July 16.	J H Applegate.	320 Sansome st	
OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS									
Buchanan G M & M Co.	California.	2.	06.	Mar 30.	May 2.	June 1.	P J Sullivan.	121 Post st	
Cabarca M Co.	Mexico.	7.	10.	Apr 20.	May 21.	June 6.	W L Elliott.	220 Sansome st	
Elko Con M Co.	Nevada.	1.	15.	Apr 10.	May 15.	Jun 7.	F Sperling.	309 California st	
Golden Fleece Gravel M Co.	California.	20.	35	00.	Apr 20.	May 28.	June 16.	F Schirmer.	785 Folsom st
Loreto M and M Co.	Mexico.	4.	10.	Apr 27.	May 15.	June 18.	H G Jones.	327 Pine st	
Lucky Hill M Co.	California.	6.	10.	Apr 2.	May 15.	June 1.	R J Huns.	436 Montgomery st	
Lucky Hill Con M Co.	Nevada.	2.	10.	Apr 2.	May 1.	Jun 4.	A C Unrich.	219 California st	
Pleasant Valley M Co.	California.	1.	15.	May 7.	June 11.	June 30.	C F Elliott.	327 Pine st	
San Miguel Con M Co.	Mexico.	2.	1.	00.	Apr 28.	June 4.	July 22.	C G Brooks.	210 Front st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Buchanan G M & M Co.	California.	2.	06.	Mar 30.	May 2.	June 1.	P J Sullivan.	121 Post st
Cabocra M Co.	Mexico.	7.	10.	Apr 20.	May 21.	June 6.	W L Elliott.	320 Sansome st
Elko Con M Co.	Nevada.	1.	15.	Apr 10.	May 15.	June 7.	F Sperling.	309 California st
Golden Fleece Gravel M Co.	California.	20.	35.	Apr 20.	May 26.	June 16.	F Schmeier.	785 Folsom st
Loreto M and M Co.	Mexico.	4.	01.	Apr 27.	May 25.	June 18.	H G Jones.	327 Pine st
Lima Con S M Co.	Arizona.	6.	05.	Apr 4.	May 15.	June 4.	R D Hopkins.	438 Montgomery st
Lucky Hill Con M Co.	Nevada.	2.	10.	Apr 2.	May 4.	June 4.	H A Ulrich.	37 Ellis st
Pleasant Valley M Co.	California.	1.	1.	May 7.	June 11.	June 30.	C E Elliott.	327 Pine st
San Miguel Con M Co.	Mexico.	2.	100.	Apr 28.	June 4.	July 22.	C G Brooks.	210 Front st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Cabocra M Co.	Mexico.	W L Elliott.	220 Sansome st.	Annual.	June 11
Caladonia M Co.	Nevada.	W L Oliver.	328 Montgomery st.	Annual.	June 5
Crown Point M Co.	Nevada.	I. Newlands.	327 Pine st.	Annual.	June 4
Excelsior Deep Gravel Co.	California.	T. I. Watson.	323 Front st.	Annual.	June 6
Golden Gate M Co.	California.	R. Hanson.	606 Sacramento st.	Annual.	June 9
Norcon M Co.	California.	R. Shinnwald.	320 Sansome st.	Annual.	June 6
Solid Silver M Co.	California.	R. Shinnwald.	606 Sacramento st.	Annual.	June 9

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Buller Con M Co.	California.	W Willis.	309 Montgomery st.	.05.	Apr 12
Contention Con M Co.	Arizona.	D C Bates.	309 Montgomery st.	.25.	May 28
Jackson M Co.	Arizona.	D C Bates.	309 Montgomery st.	.10.	Mar 17
Kentuck M Co.	Nevada.	J W Pew.	310 Pine st.	.10.	May 18
Nevado M Co.	Nevada.	J W Pew.	310 Pine st.	.25.	Apr 14
Northern Belle M & M Co.	Nevada.	Wm Willis.	309 Montgomery st.	.50.	May 14
Silver King M Co.	Arizona.	J Nash.	815 California st.	.25.	May 15
Standard Con M Co.	California.	Wm Willis.	309 Montgomery st.	.25.	May 12

Table of Highest and Lowest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 10.	WEEK ENDING May 17.	WEEK ENDING May 24.	WEEK ENDING May 31.
Alpha.	1.50	1.90	1.70	1.65
Alta.	2	35	45	6
Andes.	55c	65c	45c	55c
Albion.	40c	50c	25c	30c
Argenta.	1.05	1.25	95c	1.10c
Atlas.	1	1.11	1	1.05
Belcher.	1	1.11	1	1.05
Belding.	3.70	4.2	3.60	3.4
Best & Belcher.	80c	80c	80c	70c
Bullion.	35c	40c	35c	25c
Belle Isle.	1.05	1.25	80c	1.05
Bodie.	10c	10c	10c	10c
Banton.	10c	10c	10c	10c
Bodie Tunnel.	5c	10c	5c	10c
Caladonia.	25c	25c	25c	25c
California.	35c	45c	35c	30c
Challenge.	1.40	1.95	1.60	1.35
Chollar.	1.40	1.95	1.60	1.35
Confidence.	5c	10c	5c	10c
Con Imperial.	45c	55c	45c	50c
Con Virginia.	1.35	1.61	1.25	1.41
Crown Point.	1.35	1.61	1.25	1.41
Day.	10c	10c	10c	10c
Elko Con.	5	5	5	5
E. M. Diabolo.	5	5	5	5
Eureka Con.	5	5	5	5
Eureka Tunnel.	35c	45c	35c	30c
Excelsior.	1	1.11	90c	85c
Grand Prize.	30	2.60	2.30	2.55
Gould & Curry.	1.35	3.65	3.65	4.11
Holmes.	55c	65c	60c	55c
Independence.	50c	70c	50c	55c
Julia.	5c	5c	5c	5c
Justice.	5c	5c	5c	5c
Jackson.	2	2.15	2.15	2.15
Kentuck.	30	30	30	30
Martin White.	2.30	3.05	3.15	3.30
Mono.	2.30	3.05	3.15	3.30
Mexican.	2.30	3.05	3.15	3.30
Mt. Diabolo.	2.30	3.05	3.15	3.30
Mt. Potosi.	2.30	3.05	3.15	3.30
Noonday.	2.30	3.05	3.15	3.30
Northern Belle.	2.30	3.05	3.15	3.30
North Noonday.	2.30	3.05	3.15	3.30
Nevado.	2.30	3.05	3.15	3.30
North Belle Isle.	2.30	3.05	3.15	3.30
Ocidental.	2.30	3.05	3.15	3.30
Ophir.	2.30	3.05	3.15	3.30
Overman.	2.30	3.05	3.15	3.30
Oro.	2.30	3.05	3.15	3.30
Potosi.	2.30	3.05	3.15	3.30
Pinal.	2.30	3.05	3.15	3.30
Sage.	2.30	3.05	3.15	3.30
Sage Belcher.	2.30	3.05	3.15	3.30
Sierra Nevada.	2.30	3.05	3.15	3.30
Silver Hill.	2.30	3.05	3.15	3.30
Silver King.	2.30	3.05	3.15	3.30
Scorpion.	2.30	3.05	3.15	3.30
Solita Nevada.	2.30	3.05	3.15	3.30
Synthetic.	2.30	3.05	3.15	3.30
Tuscarora.	2.30	3.05	3.15	3.30
Union Con.	2.30	3.05	3.15	3.30
Utah.	2.30	3.05	3.15	3.30
Ward.	2.30	3.05	3.15	3.30
Wales.	2.30	3.05	3.15	3.30
Yellow Jacket.	2.30	3.05	3.15	3.30

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Bodie Tunnel, May 23d, \$3,007; Bodie, 21st, \$5,250; Christy, 23d, \$12,918; Northern Belle, 21st, \$8,330; Pinal Con., 16th, \$4,228; Standard, 21st, \$4,298; Mt. Diabolo, 21st, \$7,503; Christy, 27th, \$4,978; Mt. Diabolo, 24th, \$6,125; Nevada, 28th, \$11,500; Northern Belle, 24th, \$6,376; Yellow Jacket, 23d, \$9,906; Horn Silver, 22d, \$18,000; Bullionville, 22d, \$2,510; Stormont, 22d, \$3,170; Hanauer, 22d, \$1,530; Horn Silver, 23d, \$6,000; Bullionville, 23d, \$2,728; Hanauer, 24th, \$1,000; Crescent, \$3,970; Ontario, 26th, \$11,517; Alice, 27th, \$2,236, and for May, \$70,320; Horn Silver, 27th, \$33,000; Ontario, 27th, \$10,884; Bullionville, 27th, \$2,516.

Sales at San Francisco Stock Exchange.

THURSDAY A. M., May 31.	50c	Sierra Nevada.	77.1
300 Argenta.	55c	1050 Scorpion.	906.95c
180 Andes.	1.05	40 Silver King.	10.62c
100 Alta.	90c	400 Tipton.	25c
100 Alpila.	1.05	150 Tipton.	25c
800 Benton.	20c	20 Utah.	25c
100 Bodie Con.	1.05	1620 Union.	77.78c
655 B. & Belcher.	3.37	235 Yellow Jacket.	80.45c
270 Bullion.	1.61	350 Chollar.	4.10c
1100 Con. Imperial.	55c	250 California.	55.00c
435 Chollar.	4.05	100 Albion.	1.40c
160 Crown Point.	1.90	380 B. & Belcher.	54.05c
100 Confidence.	3.63	250 Bodie Con.	1.05
240 Caladonia.	2.05	100 Grand Prize.	4.10c
1370 Con. Imperial.	55c	100 California.	55.00c
600 Eureka Con.	3.24	2480 Con. Virginia.	75.65c
500 Excelsior.	50c	500 Elco Con.	25c
550 Grand Prize.	35c	120 Eureka Con.	25c
400 Gould & Curry.	3.00	100 Grand Prize.	4.10c
1140 Hale & Nor.	8.00	535 Gould & Curry.	30.00c
250 Julia.	3.00	150 Hale & Nor.	8.00c
Martin White.	3.00	125 Mexico.	4.85
40 Mexico.	5.05	375 M. White.	30c
Nevado.	5.05	200 Nevada.	1.55
75 Northern Belle.	6.25	300 N. Belle Is.	5.00c
780 Ophir.	3.90	955 Ophir.	3.80
10 Occidental.	2.30	380 Potosi.	1.80
600 Overman.	65c	850 Savage.	3.00
330 Potosi.	1.85	200 Tipton.	25c
1050 Savage.	2.90		

Mining Share Market.

There has been quite a little flurry in mining stocks this week as our table shows. The general impression seems to be that developments will be made shortly on some of the Comstock mines. Senator Fair has gone away to Europe and left the Comstock to its fate, even giving it something of a "set back" in an interview with a reporter, notwithstanding which, prices have been firm. The Virginia Enterprise is conservative on the subject, and in an issue of recent date says: Prices are still low for leading stocks, and the developments made would perhaps justify still higher prices at some points, but purchasers should bear in mind the fact that as yet no new bonanza has been struck. We are always desirous of saying the best that can possibly be said for every mine on the Comstock, but just at present we can see no foundation for a boom. The San Francisco people appear to think differently, and are now managing things to suit themselves.

At the north end there is as yet no sign of ore in the Sierra Nevada and Union Consolidated winze, but doubtless when the 3000 level is reached and a drift run west a deposit of value will be found. The fine showing of ore on the 2900 is proof of this. Should it be thought worth while, this ore might now be followed down by means of winzes. It is of rather low grade, and such a plan of working would be poor economy.

At the south end of the lode quite a bonanza of low grade ore has been found in the Yellow Jacket. In the Belcher and Crown Point a good deal of ore is in sight in all the openings.

It is said 100 Mormon immigrants from Switzerland, poor, ignorant, and in many cases infamable creatures, to get rid of whom the communes are willing to pay 160 francs per head, are coming by the steamship Nevada, of the Guion line, which left Liverpool on May 16th.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MAMMOTH.—*Ledger*, May 26: Senator J. P. Jones and others have secured an interest in this prominent mine. A working capital of \$100,000 is to be put in the treasury for a systematic development of the claim. A tunnel is to be run from near the Mokelumne river. This will strike the ledge on the Mammoth ground at a distance of about 800 feet from its mouth. It will then have to run over 1,000 feet more to reach underneath the present shaft. It will tap the ledge at a depth of nearly 1,000 feet. The tunnel is to be of a most substantial character, supplied with a double track. Operations were started on this undertaking last week, and it will be pushed ahead with all possible speed. As soon as the ledge is struck, the intention is to put up a 40-stamp mill. The tunnel will take at least six months to complete, making an average of 10 feet per day. Air compressor drills will be used, operated by water power by means of one of Knight's wheels. The same water that runs the mill, can also be used to run the drills. It is estimated that the construction of the tunnel will cost from \$25,000 to \$30,000.

BUNKER HILL.—We are pleased to be able to report a prosperous state of affairs at this mine. The ledge of good milling ore encountered in the footwall at the 500-foot level continues to yield well. About 30 feet have been stoped out at the north end, and the face looks as well as ever. One clean-up has been made, which realized something over working expenses, but how much we are not prepared to state. It is satisfactory to know, however, that all the hands were paid off promptly at the end of the month, and also the first installment on the old indebtedness was paid at the time agreed upon. The present run is expected to turn out even better than the previous one. Free gold is occasionally to be seen in the ore. From 25 to 30 men are employed, and 10 stamps of the mill are running. The ore is being extracted from the 500 and 270-foot levels. The property is being judiciously managed under the superintendency of N. W. Crocker, with J. W. Truscott, a first-class practical miner, in charge of the underground works.

MISCELLANEOUS.—The Loyal Lead is being vigorously worked. A 10-stamp mill is pounding away steadily on ore taken from the long tunnel running south. A substantial track, some 500 or 600 feet long, enables the ore to be run easily to the mill. One clean-up has been made, and we understand the amount came up to the expectations of the owners. At the South Spring Hill claim sinking is being prosecuted. The shaft is over 500 feet deep, and the indications are of such a character as to induce continued sinking. Eight of W. Moon's teams are busy hauling rock from Morgan's claim to the Kelly mill. They are putting it at the mill at the rate of 45 tons per day. The mill is running full swing, and crushing it about as fast as it is being hauled.

VOLCANO.—*Sentinel*, May 23: Volcano is no duller than other towns where water in proper quantities and in proper times makes prosperity. The late rains very much aided the small mines; the large hydraulic mines were not helped, however. The output from this district will be considerable. The Downs mine has good rock for a 40-stamp mill; its capacity is only 20 stamps. The ore is good working ore, averaging \$20 per ton. Mason's prospect on Kate Gray gulch is most gratifying. He has a three-foot ledge, with good defined walls. The pay chute or chimney is over 200 feet long. The rock prospected will reach or exceed \$40 per ton. The Pioneer district is looming up. The Moloc has 150 tons of ore on the dump. No one estimates that it will average less than \$40 per ton, and six men can keep the mill (10 stamps) running continually on the same rock. The Stoken mine looks well. Twenty-five tons are on the dump, which experts average at \$60 per ton, with a good ledge. The Tunnel Co. has cleaned up. The amount taken out I do not know. Enough has leaked out for us to know that the ground is far richer than last year, and the return is gratifying to the owners. Hadley & Vail have water for three weeks' more run, and will not clean up till the end of the season. They are doing well. Geo. Evans, at Rancheria, is in the same fix.

Calaveras.

MINE SOLD.—*Chronicle*, May 22: The quartz mine known as the "Star of the West," located at Skull Flat, about three miles from West Point, and owned by Mr. Carey of that place, was recently purchased by a party from Sacramento. The mine has been idle for some time, but operations are now to be commenced upon it at once. The amount for which the property was sold we did not learn.

NOTES.—*Mountain Echo*, May 22: We learn that work will soon be commenced in the Jack Rabbit, near Monarchville. We understand that preparations are making for the erection of a mill on the Morgan mine at Carson's. Twenty more stamps are to be added to the Gold Cliff mines as soon as the material can be obtained. Mining prospects are daily growing better in this section. There are at present seven or eight arrastras running steadily and paying well. Also, two mills—one ten and the other twenty stamps—and several more in course of construction.

El Dorado.

BENFOLD'S GRAVEL MINE.—*Mountain Democrat*, May 26: On Tuesday of last week, Fred Benfold started up again at his gravel mine near Smith's Flat, which had been shut down since the cold weather had frozen up the water with which his machinery is run, and compelled him to stop. Of course, in the meantime the lower works had filled with water, and it was a matter of considerable trouble and expense to restore affairs to their former condition. He has about twenty-five men at work, which force will probably be increased to forty or fifty within a short time. This mine is the mainstay of Smith's Flat, which, if a new bench is struck soon in the Kum Fa, as is confidently predicted, will be one of the liveliest little camps in our country.

RICHER THAN EVER.—At the Mount Pleasant mine, Grizzly Flat, they have been sinking the main shaft from the 400-foot level, with the intention of running a new level at a depth of 500 feet from the surface. Before starting the new level they must

sink to a depth of 515 feet, the additional 15 being for a sump. Last Sunday morning, about three o'clock, having reached a depth of about 507 feet, a body of high grade ore was found making into the shaft, quarter

the pay chute is still going downward and eastward according to its usual direction. The distance between the 13th and 14th levels is 200 ft., which will save a large amount of new backs. The sinking of the incline below the 14th level will be resumed as soon as the water power connections are made to the pumping and hoisting work, which is now only the matter of a short time.

Placer.

THE ORE ROASTING SYSTEM.—*Placer Herald*, May 18: The roasting furnace in operation at the old Blossom mine seems to be just what the miners of this county have been waiting for, viz: Something that would save a larger percentage of the gold at a moderate cost. Most of the ore from the ledges in this part of the county will assay from \$50 to several hundred dollars per ton, and yet by the mill process is considered good rock that returns from \$10 to \$5 per ton. By the furnace process above referred to the gold and silver can be saved close up to the assay value, and we understand the expense of the process is comparatively light. There is encouragement would seem, for others to adopt this process, and with a dozen or more of these roasters in operation this neighborhood this would be a lively camp. Even by the old process the returns being received from the different mines in this locality at present are together encouraging.

A NEW MINING LOCATION.—*Placer Times*, May 18: A few weeks ago parties from Sacramento, and a new location partly on the old abandoned Alta Belle gravel mine, at Alta. The new claim is called the Alta Placer Mine, and contains 140 acres, section 36, 15 north, 10 east. S. Spencer and R. Reed, were up from Sacramento, Saturday, and completed arrangements to commence work in a short time. A stock company will be incorporated and shares offered for sale. The claim will be drifted through an incline shaft started in the Shady Glen Placer Mine ground, adjoining on the south. Work on the old Alta Belle mine, about 11 years ago, satisfactorily proved that a rich lead runs through the claim. The last day's work turned out \$16 a day to the man, but on account of a continuous litigation with reference to title, work was suspended. Miners who are acquainted with the ground certify that it is the richest of any in this section. The new company can confidently expect to strike a big thing when the incline gravel channel is opened out thoroughly.

THE IRON FURNACE IN OPERATION.—*Placer Herald*, May 26: The iron blast furnace andundry buildings, at Hotelling, destroyed by fire some time ago, have all been replaced on an improved plan, and after some delay, caused by defects in the elevators, the blast was put on last Saturday, when everything, we learn, worked smooth and quite satisfactory to those in charge. They have already added a pile of new iron in the yard, and every prospect before them for a successful summer's run. According to one authority they have on hand 14,000 cords of wood, 300,000 bushels of coal, and 8,000 tons of iron ore. They are at present working two deposits of ore, both of which yield a high grade, and are extensive. More or less improvements have been made in and around the town, including a new office for the superintendent and other new buildings. Together the place promises to be more prosperous in the future than even before.

Plumas.

ARADIAN MILL.—*Greenville Bulletin*, May 23: Ore from the Sunset ledge continues to be worked in the mill, giving results thus far as good as was reached during the previous month.

PLUMAS CON.—A vein of ore about four ft wide has been struck in a prospect tunnel, the ore is of fair quality, the ledge appears to be well defined, and stands nearly vertical. It is thought that this vein is only a stringer, and will soon run into a much larger ore body. This and other circumstances are likely to put the Plumas Con. in a prosperous condition before long.

INDIAN VALLEY MINE.—About 6 A. M. to-day the pinions of the hoisting engine were completely tripped of teeth, the thing was done in a moment, and the engineer instantly applied the brake which held good and no further damage was done. Mr. Harland, the superintendent, was on hand in a few minutes and had men at work clearing away the broken machinery; he will push the work with his usual energy so that the delay occasioned will not exceed a week.

WILES LEDGE.—Years ago two brothers named Wiles worked a placer claim on the west side of the reservoir, at Round valley; they took out a good deal of money and then sold the claim to parties who never tried to do much with it. For some months past John Ellis has been prospecting on the same ground for quartz and before the late storm set in had found a ledge; when water began to run a stream was turned along on the top of the ledge and it washed off for a distance of 60 ft or more. So far it uncovered the vein averages over five ft wide and prospects from 20 to 30 dollars per ton. The parties interested propose to lease the Kettle mill and proceed at once to work the mine; the distance from the mine to the mill is only a few hundred yards, the ore can be got and worked very cheaply.

San Bernardino.

BULLION.—*Calico Print*, May 19: Last Wednesday 345 pounds of bullion were shipped from the Silver Odessa mill, at Hawley's, valued at \$5,300, being the returns from Alhambra ore. Yesterday, 155 pounds of bullion, valued at \$2,400, were shipped from the Oriental mill.

PROVIDENCE ITEMS.—There has been shipped for the first two weeks of this month by the Bonanza King Con. mill, \$33,258, besides considerable unreported amalgam. The shipments for the present month's returns will not be less than \$70,000. The Belle McGilroy and Mozart group of mines have been bonded during the past week to San Francisco parties. The bonds compel them to work during the coming months. A large force of men will be sent from San Francisco to start up the works. C. N. Hasson and W. B. Caldwell left this morning for the west side of the mountains on a prospecting tour. The ore dumps of the Bonanza King have been largely increased during the past two weeks.

AT THE LAVA BEDS.—Messrs. S. H. Baker and J. M. Parker, and another gentleman, are now at the Lava Beds working on some claims that they had located. They have run in a tunnel on one claim a distance of thirty feet, and the showing is good. They are now sinking a well in the alkali flat near the Clark mine, and are down about twelve feet.

They believe that they will succeed in getting plenty of water, which will be of great value in developing the mines.

THE IREX MINE.—*Calico Print*, May 26: The Irex mill is completed. She started on Monday, May 21st, on the poorest ore, and as soon as the crevices are filled in they will commence on the best ore. The mill is the best and most complete little raw working mill that can be seen anywhere, and quite different from other raw working mills. She can be made, by the addition of a Howell Chloridizing Furnace, a first class roasting mill. She has for that purpose wood sides to her pans and sculer, and the necessary Howell millers, dies and movable miller arms with Stevenson's millboards set in cement. All this is different from the ordinary iron side pans, so common in raw mills, and so valueless if the mill at any time is changed so as to work roasted ore. The machinery is entirely new and first class, and the manner in which she is built does credit to the architect, O. Crandall, Esq., of San Francisco, who left nothing undone to make her the first class, complete, solid little mill that she is. The man who does such work without any specifications or written contract, other than a verbal agreement, as was done by Mr. Crandall, is worthy of appreciation.

Shasta.

FURNACEVILLE.—*Cor. Shasta Courier*, May 22: The Afterthought mill shut down a few days ago for repairs; but the actual cause though, was no wood, as on account of the recent long continued rains the roads were in such a condition that hauling could not be done. The prospects are very good, but on account of the limited amounts of necessary works, such as agitators, pans, leeches, etc., the stamps can only be run a small portion of the time; the result, however, of the ores put through is very favorable. Mr. Stewart has just sent down by Mr. Rediker another truck, and at the mill there are 30 sacks of 150 lbs. each of cement copper ready for shipment, that yields about 85 per cent; former shipments have always made satisfactory returns. About 25 men are now employed in and about the mill. Messrs Morley & Salsbury have a claim in the district, near the Afterthought mill, that prospects well in gold; they are now running a tunnel on the vein, and talk of putting up an anastra.

Sierra.

THE PLUMBAGO MINE.—*Sierra Tribune*, May 26: A gentleman from San Francisco examined the above property last week, with a view of making a report on the same to an English company. The Plumbago quartz mine is located at Minnesota. The mine has been opened sufficiently to prove that it could be made a big paying property if properly handled.

SAVAGE MINE.—J. Minor Taylor is expected to arrive here from Virginia city soon to start up work at the Savage mine. The recent developments made by the Bald Mountain Extension Company is liable to create a boom all along the ridge this summer. It is the opinion of all those who have paid any attention to the workings of the Savage mine that a channel will be uncovered in that claim at an early date.

CHINESE MINERS.—Seven or eight Chinamen have built flumes and a dam, erected a derrick, and made other preparations for mining the ground in the creek by the Masonic hall, and upon which Mr. F. D. Soward's building stood. It is quite interesting to watch the heathens hunt for gold.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Enterprise*, May 26: On the 2900 level the joint Union Consolidated winze is now down nearly 70 feet. It is in a favorable formation, and is being sunk at the rate of nearly 20 feet per week. It will be eventually put down to the 3700 level, where it will connect with the drift now going north from the joint Ophir and Mexican winze. The end of the ore has been reached in north drift No. 2 on the 2900 level.

HULE AND NOCKROSS.—The station for the winze is almost completed. In cutting out this station a new streak of good ore some ten inches wide was encountered. These streaks appear to widen in going down, and are probably the top of a deposit that will open out when followed down by the winze. There is no trouble with water. The ore is of a strong appearance.

BEST AND BELCHER.—The northwest drift on the 2500 level is being advanced in ground that is hard and dry. It has been long since there has been any crosscutting in this mine. They will soon be in a position to make extensive explorations.

UNION CONSOLIDATED.—In south drift No. 2, on the 2900 level, the end of the ore deposit has been reached.

YELLOW JACKRABBIT.—The mine is yielding well at nearly all points. Quite a bonanza of low grade ore has been found in new ground on what the miners term the "Frog Pond Level." This is really quite a valuable discovery. The mine is really looking very fine throughout.

OPHIR.—A considerable quantity of ore is still being extracted from the croppings, and this work will be much facilitated by the opening out of the old tunnel.

CHOLLAR.—In crosscut No. 3, on the 2600 level, good progress has been made during the week in quartz of a good appearance, though not carrying much metal.

Bald Mountain District.

FREE GOLD.—*Eureka Sentinel*, May 26: Luther Clark returned from Bald Mountain yesterday, bringing with him some specimens of white quartz, showing specks of free gold. This character of rock is abundant in Bald Mountain district, in wide ledges, which crop out boldly on the surface, but have not been prospected to any considerable depth. A number of years ago Pete Lovell tried an anastra on the ground, and washed the gravel in one of the canyons, but it did not pay very well, owing to the scarcity of water. The principal feature of mining in Bald Mountain district is the excellent prospect it offers of showing up valuable copper mines. Fine surface bodies of copper have been uncovered, but the deposits, as in the case of the gold ledges, have not been worked deep enough, except in the case of George Lamoureux's claims, and one or two others, to prove whether they will be of permanent value or not. Judge Adams is on the ground, comfortably housed in his new cabin, and is about to begin his summer's work prospecting.

Columbus District.

THE LUCKY HILL STRIKE.—*True Figure*, May 26: Within the present month another bit of pleasant news has been given to this community, and one that again brings to the front the Columbus mining district. The property of the Lucky Hill mining company adjoins that of the Columbus Consolidated on the west, and it was thought the body of ore found in the latter extended into the ground of the former. Accordingly a shaft was started about 200 feet from the line, and at a depth of but a few feet a ledge 20 feet in width was encountered, which contains some fair, good and high grade ore. An average of the whole gives fine assays, and as the work continues, the outlook is highly encouraging.

NORTHERN BELLE.—Sinking has been commenced on a streak of ore found on the eleventh level, which, it is thought, will connect with the body of ore encountered above the first shaft level. The prospecting operations in all parts of the mine are being pushed ahead as rapidly as possible, and all work in and around the mine is progressing satisfactorily. The daily output of ore has been about fifty-four tons. Both mills are running steadily and doing good work. The bullion shipments amounted to \$14,741.83 for the week ending May 24th, and a total of \$42,155.33 has been shipped on May account to the same date.

MOUNT DIABLO.—The slope above the west drift from the Fallon winze is looking well; the west end shows 2 feet of \$80 ore, while in the center there are 3½ feet of \$75 ore. A little ore is being stored from a point on the first level, near the shaft, and also from the Mount Diablo adit. Two bullion shipments were made during the week—one on the 17th inst. of \$6,140.04, and one of \$7,503.39 on the 25th.

Eureka District.

ANOTHER FURNACE.—*Eureka Sentinel*, May 23: Another furnace will be started up to-day at the Eureka Con. reduction works. The bins at the works are filled at present with Eureka Con. and tribute ores. The idea in starting up another furnace is to get the mass of this ore out of the way, in anticipation of increased shipments from the Eureka Tunnel in a few days upon the completion of the new shaft, through which it is calculated ore will begin to be hoisted by steam next Sunday. It is understood, also, that arrangements will be completed within a very short time by which ore will be allowed to be shipped for reduction from the Albion. The tributers in this mine are reported to be doing very well in their pitches, from which, and from other parts of the mine generally, it is believed enough can be shipped to help out materially in keeping one furnace at work. In connection with this it may not be out of order to say that a number of mines on Prospect mountain are looking well, and give promise altogether of a good ore product this summer. If the outlook is not deceptive, there will probably be enough custom ores shipped to the Eureka Con. works to keep the additional furnace running for some time. If they strike ore in the Locan shaft, as is expected, we may speculate upon the starting up of the remaining furnace before the opening of another winter. This is a consummation devoutly to be wished, and we'll hope for it if we can't do anything more.

A NEW DEPARTURE.—*Eureka Sentinel*: The steam hoisting engine at the Eureka Tunnel will start up to-day. This will mark an important epoch in the history of the mine. From to-day on the facilities for working will be greatly enlarged, and ore shipments very much increased. With the powerful aid of steam developments will be rapidly pushed forward, and the mine thoroughly explored at greater and greater depth. We may say that to-day the first step was taken towards solving the problem whether Prospect mountain is, what it is supposed by miners in this camp to be, a rich and extensive deposit of paying ores.

Jackrabbit District.

KING FISHER.—*Pioche Record*, May 18: On Tuesday we took a flying trip out to Jackrabbit district for the purpose of looking at this much talked of claim. We found there had been very little work as yet done on the claim, nothing but the lime cap having been removed. At the place where it is intended to sink the shaft, there is a gray carbonate ore, the ledge being claimed to be 18 ft in width. The assays from this ore range from \$20 to \$100. All indications here tend to confirm the belief that there is a large deposit of ore at this point. A few feet up the hill, in a hole about three feet in depth, between the surface dirt and cap rock, there is a seam of soft, rich yellow ore, we should judge from four to seven inches in width, which assays from \$150 to \$600, and of course picked pieces would show up into the thousands. This character of ore has been taken out at several places on the surface, always found between dirt and cap. About three tons of this rich ore have been extracted. This claim has a remarkably excellent top showing, and if the gray carbonate should develop into the body of ore that its owners believe it will, they then will have a good and valuable mine. The King Fisher is an old Burrows location, then known as the Blue Bird. During the week word was sent in that a shot had been put in the gray carbonate ore and that about 20 tons of good ore was broken. It appears to be an immense blow out.

Safford District.

STRUCK ORE.—*Eureka Sentinel*, May 26: A letter received from Palisade last evening states that a fine vein of ore has been found in the Illinois claim at Safford. This mine is owned by T. R. Jewell and O. W. P. Bailly, and joins the celebrated Onondaga on the west. Work has been continuously done on this claim, but until yesterday no ore of any importance had been discovered, though its close proximity to the Onondaga has always led the owners to believe that mineral in paying quantities would be found.

ARIZONA.

OLD DOMINION COPPER.—*Globe Chronicle*, May 19: Furnace No. 1 of the Old Dominion Co. was started last on the 7th of April and has been running continuously ever since, producing for the 41 days ending at 7 o'clock yesterday morning 298,155.9-2000 tons of bullion. Furnace No. 2 was started on April 18th and had also been in constant operation, the joint product of the two furnaces being 474,710-2000 tons. The single and joint runs of the furnaces are the best on record. Furnace No. 3 was started up. All three of the furnaces are now running regularly.

COLORADO.

LEASING MINES.—*Register-Call*, May 23: Thomas McCall, William Agnew, J. J. Reilly, Richard Jenkins, Willis Marks and O. P. Russell, have taken a lease of the James Henry lode on Gunnell hill. Two drifts are being driven at the respective depths of 40 and 105 ft. Yesterday they were engaged in clearing the main shaft of accumulated water.

E. W. Henderson, E. S. Mills, Robert E. Morris, Nate A. Sears and David Winton have taken a lease of the Whiting and Butler mines on Gunnell hill. They are sinking the main shaft on the former vein, which is now down to a depth of 225 ft. and drifting both east and west. East of the Whiting, L. R. Wolcott and Wm. Bowdin have sub-leased what is now known as the Spur lode, a feeder to the Whiting. They are sinking a shaft to make a connection with a drift on the Whiting, where it is claimed there is a body of mill dirt.

The usual number of miners are employed on the Gunnell, the principal portion of the work being done by tributers.

The Prize mine, worked by J. W. Bostwick, Den Sullivan and others, are taking out a good quality of mill and smelter ore.

Wm. Richards continues development work on the Jones. Both the milling and smelting ore keeps up to its former standard.

A pool of miners has been formed in Nevada to work the property of the Gilpin County M. Co., on the Burroughs lode. There is a good plant of machinery over the mine. Work has been commenced, and as the pool is composed of practical miners, good results from their developments of that portion of the Burroughs can be anticipated.

IDAHO.

THE ONTARIO.—*Ketchum Keystone*, May 22: This mine exhibits a beautiful body of galena in the breast of the latest work, ore that is nearly three feet thick and perfectly solid. Ore has been taken from it in large quantities for several days and still the vein holds out with remarkable richness. Two men are at work on the Black Horse claim.

FORTY-TON SMELTER-PLANT.—*Wood River Times*, May 26: It is stated that Supt. Chase, of the Davitt mine, on Deer creek, is taking definite action toward the construction of a 40-ton smelter-plant adjoining the Bailey sampling works, below town, which will have all the latest improvements, including Cornish rollers, and all needed appliances for successfully treating Wood river ores, the works to be finished early this season. The project seems to be so far well inaugurated, and if the works are completed there will be another home market made here for ores, and the number of men which will be steadily employed by the work will add to the prosperity of the town. Mr. Chase and the Davitt Co. are said to mean to have a smelter here, even if they are compelled to build it themselves.

MONTANA.

VARIOUS MINES.—*Inter-Mountain*, May 22: The Mount Moriah continues to produce 15 tons of ore daily. Good ore has been struck in the south 320 ft crosscut of the La Plata. Preparations are being made to sink the main shaft of the Colusa to the depth of 400 ft. It is now 260 ft deep. The Montana smelter is now running at full blast. It is reported that Wm. McCaskle will have charge of the Anaconda smelter when completed. The Moulton now ranks as one of the most reliable producers among the silver mines in Montana. Work has been temporarily suspended on the Shakespeare on account of the departure of Mr. Claggett, one of the owners. The immense strike in the Poser holds out in fine shape and is proving one of the most important ever made in the district. It is the intention of the Anaconda Co. in the near future to put upon the St. Lawrence a similar hoist to that on the Anaconda. The surface cut on the Magna Charta is producing daily 20 tons of ore assaying from \$50 to \$90. The Parrot mine under first-class business management, is moving on the even tenor of its way and has no trouble in supplying the smelter with all the ore it can treat. The daily output now is about 60 tons. The Gagnon is opening up fine on 500 level. In the 400 level the vein was somewhat segregated, but in the new level it is all together, and the face of the east drift presents a compact ore body seven feet wide, assaying from \$75 to \$100 per ton according to sample assays. Some of the ore is of very high grade.

UTAH.

PARK CITY MINES.—*Salt Lake Tribune*, May 25: R. Mackintosh who went to Park City the other day made a minute examination of several mines there, and what he says of them is of much importance, he being so familiar with mining matters. The first mine visited was the Crescent, and he passed through all its workings. He says that Mr. Daly, the superintendent, has opened up the property in excellent style, exposing large bodies of ore. The ore at the upper workings of the Crescent property is low grade, and as depth on the vein is attained, it grows richer, bringing the average well up. Mr. Mackintosh classes the mine as being the largest, cleanest and best body of lead ore he ever saw, and says the quantity is so enormous that it is foolish to attempt an estimate of it; that it exceeds the most sanguine expectations of the stockholders. He describes the mine as having all the workings connected, and says that as much ore as there is exposed 100 tons per day may be taken out for the next 12 months, and there will be more in sight than at this time. The Apex he describes as looking well. Work is going on at the top of the ore chute and is liable to open up a large ore body in the belt of the ore zone. On the Silver Key they have drifted 100 ft on the ore chute, where they have two feet of solid ore, which runs from 70 to 120 ounces silver, and the property looks very promising. He visited the Sampson and found the two compartment shaft down 20 ft, and work being pushed. They intend to cut the vein 200 ft below the present workings on the incline. The property he classes as fine and reports 20 men employed. Snow on the Apex ground lies from six to ten feet, and on the Crescent it is nearly gone. The Crescent Co. have a new road up Thayne's Canyon, which they have commenced using, and this enables them to send down 40 tons per day. This will be increased to about double this amount soon. The sampler is handling about 40 tons of ore per day, and expects to handle 100 soon. The Park is looking up, and the outlook is bright.

How a Scale Insect Grows.

Few who are able to recognize scale insects on sight have ever informed themselves accurately upon the progress of growth of the insect from the egg to maturity. The study is one requiring close attention and can be traced only by one who has given much time to the observation of entomological phenomena, but the general reader can by reading obtain an idea of the method and time in development which will be of interest and value.

We propose to expound this matter by the publication of Prof. J. Henry Comstock's account of the life-history of the red scale insect of Florida (*Aspidiotus ficus*), which resembles the red scale which afflicts our orange growers. The appearance of the insect at its different stages is given in the engraving. Of course there are special manifestations in the growth of this insect which are characteristic of it, but in many points it no doubt resembles others of its class.

Prof. Comstock obtained the eggs of this insect from Florida and put them upon orange trees growing in pots in his office in Washington. The day after they were placed upon the trees, April 13, the eggs began to hatch. The newly hatched larva (Fig. 2 c) is broadly oval in outline and yellow in color. The antennae are five jointed; the three basal joints are very short and nearly equal in length; the fourth and fifth joints are each longer than the three basal joints together. The fifth joint is strongly tuberculated at tip so as to appear bifurcated. The eyes are prominent and of the same color as the body. The young larva are quite active, but they settle soon after hatching. Some settled the same day that they hatched.

April 14, it was found that the young lice, although only twenty-four hours old, had formed scales which completely concealed them from sight. These scales resembled in appearance the fruiting organs of certain minute fungi. They were white, circular, convex, with a slightly depressed ring around the central portion (Fig. 2 d); their texture was quite dense, and they were not firmly attached either to the insects or the leaf, a slight touch being sufficient to remove them without disturbing the larva. The larva had not changed in appearance, and were able to move their legs and antennae.

April 15, the lice had not changed perceptibly. The scales had become higher and more rounded.

April 16, the lice had contracted considerably, being now nearly circular, at least as broad as long; in other respects there was no apparent change. The scales were found to vary somewhat; those most advanced having the central portion covered with a loose mass of curled white threads. (Fig. 2 e.)

April 17, there was apparent no further change in the larva; but the mass of threads covering the central part of the scale was found in some specimens to have greatly increased in size, equalling in height three or four times the width of the scale. This mass is cottony in appearance, and in those specimens where it is largest is more or less in the form of a plate twisted into a close spiral. (Fig. 2 f.)

April 19, not much change was apparent in the larva, but the mass of cottony excretion upon some of the scales had increased enormously; so that in some cases it extended in a curve from the scale to a point five times the width of the scale above the leaf and down to the leaf.

April 21, it was observed that the larva had become more or less transparent, and marked with large irregular yellow spots near the lateral margin of the head and thorax, and with a transverse row of similar spots across the base of the abdomen; the tip of the abdomen is very faintly yellow.

April 23, it was observed that the scales appeared faintly reddish in color with the center white; the reddish color, however, was due in part to the body of the larva, which is now orange-red, showing through the scale. It should be noted that in only a part of the specimens did the cottony mass become enlarged as represented in Fig. 2 f. The greater part of the scales remained until this date of the form shown in Fig. 2 e, and the cottony spirals have now disappeared, probably having been blown away.

April 24, some of the larva had become deep orange in color.

April 26, most of the scales had become deep orange in color with the central part white; some had at the center a small nipple-like protuberance; others still preserved a short tuft of a cottony excretion. This tuft is either removed by wind or otherwise, or it becomes compact, melted, as it were, to form the nipple-like projection referred to above.

April 28, the insects appeared as they did two days ago; the scales had become very tough, and it was with difficulty that they could be removed from the insect.

April 30, the insects still remained apparently unchanged. Some of the scales were only about one half as large as others, and still remained perfectly white; they proved to be male scales. All the scales at this date had an elevated ring on the disk, with a central nipple.

May 3, many of the larva began to show that they were about to molt, the form of the next stage being visible through the skin of the insect.

May 5, nearly all of the larva had molted; they were now orange-yellow, with the end of the body colorless. The molted skin adheres to the inside of the little scale, and therefore cannot be seen from the outside. The scales are now pink, or rose colored, with a center white.

May 14th, the insects had become a somewhat paler yellow, with the anal segment slightly darker. Most of the scales were now dark purple. On removing an insect a very delicate round white plate was observed adhering to the leaf where the mouth parts were inserted.

May 18th, the male scales were fully grown. At this stage they were dark reddish brown in color, with the center white, and the posterior side, which is elongated, gray. At this date some of the males had transformed to pupae; others were still in the larva state; these larva were covered with roundish, more or less confluent yellow spots, leaving only the margin colorless; the end of the body was pale orange. The newly-transformed pupae resembled in markings the larva just described. None of the females had yet molted the second time; their color was deep orange.

May 21st, nearly all of the males had changed to pupae. It was observed that the last larval skin is pushed backwards from under the scale, to the edge of which it frequently adheres.

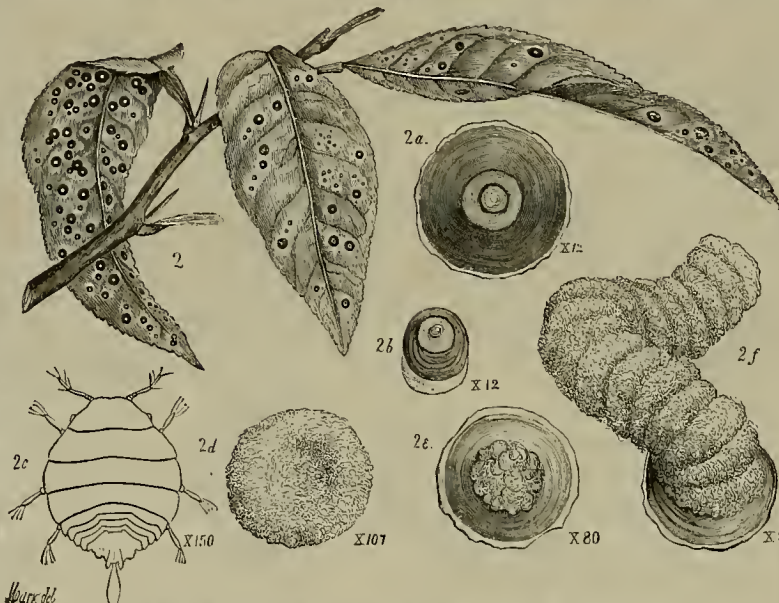
May 24th, none of the male pupae had transformed to the adult state.

May 29th, it was found that during the five days previous more than one-half of the males had issued, and the remainder, though still under the scales, were in the adult state. It was now forty-seven days from the time the larva hatched.

June 2nd, no males could be found; the females were about one-half grown, and were whitish with irregular yellow spots.

June 9th, eggs were observed within the body of a female.

June 17th, it was found that one of the females had deposited nine eggs, of which six had



THE RED SCALE OF FLORIDA. AND ITS GROWTH.

hatched. This is sixty-six days from the hatching of the egg, and probably about twenty days after impregnation of the female.

Two California Mines.

At the recent half yearly meeting of shareholders of the Plumas Eureka, in London, accounts showed a balance on the half year ending Dec. 31st, 1882, of \$141,600. A dividend of \$70,313 was recommended. The quantity of ore produced during the half year was 20,075 tons from the Plumas Eureka mine, 755 tons from the Seventy-Six mine, and 8,630 tons from the Rough and Ready and Elizabeth mines, giving a total output of 29,460 tons. The mills reduced 29,490 tons. The average cost of mining, including prospecting, was \$3.35 per ton, thus making the average working expenses \$3.80 per ton. The average yield of the ore in free gold was \$6.60 per ton.

At the meeting of the shareholders of the Sierra Buttes, the accounts showed net balance on the half year's product ending December 31, 1883, of \$43,800. A dividend aggregating \$30,625 was recommended leaving \$13,175 to be added to reserve. The amounts paid in connection with the Cross and Co. assets settlement, as the proportion applicable to the mine, have been written off, and the question has thus been finally disposed of. The mine produced 15,769 tons of ore during the half year, and the same quantity reduced by the mill. The average yield of the ore was \$7.48 per ton, and including the produce of the tailings \$8.18 per ton. The working expenses average \$5.56 per ton, the mining cost including all prospecting having been \$4.98, and the milling cost \$0.58 per ton. Excluding the cost of the eighth and ninth levels, the average working expenses would have been \$4.15 per ton. It may be mentioned that the cost of constructing the eighth level was \$51 and of the ninth \$90 per ton of ore worked.

The Action of Heat on Clinkers.

The particular objection to the combination and fusing of the silica, lime, potash, soda and sulphur in the ashes of coal into a vitreous mass is that unless the greatest care is exercised it will accumulate upon the grate bars in sufficient quantity to exclude the passage of the air necessary for combustion, and thus lower the temperature of the furnace. The several constituents of the ashes are variable in their nature, and by the forms which they take under different intensities of combustion, greatly affect the efficiency of the coals to which they belong. Being differently fusible themselves, and affecting differently the fusion of each other, no two of the earth's alkalies or metallic oxides of the ashes are alike in their agency when subjected to an elevated heat, and their mutual reactions are, moreover, changed as the temperatures to which they are exposed are changed. It hence arises that the residue from many coal-melts to a large extent under no very intense heat into various descriptions of hard and semi-vitreous slags. Others yield a less stony clinker, and some, again, at a far more elevated heat result in a partially agglutinated, spongy, open cinder, or even in a flaky ash. There are, perhaps, no coals whose ashes, when exposed to the highest temperatures procurable by artificial blasts, will not soften to a cohering cinder, or even melt in part into a stony clinker. As the tendencies, however, to these several degrees of fusion are various, it proves to be a distinction affecting the practical value of coals, which is of the utmost importance. In domestic consumption, where the heat of combustion is comparatively moderate, the quantity rather than the quality of fusibility of the ashes is the point of greatest consideration. Where, however, an excessive and melting heat is required,

Mineral Deposits of British Burmah.

Although the Burmans, as a nation, exist almost entirely by agriculture, and although the country has hitherto been little explored, enough work has been done to show that the metalliferous wealth of Lower Burmah, Upper Burmah, Karennie, and the surrounding States, is exceedingly rich and varied, so that it is doubtful whether Siam or Lower Cochinchina are much more bountifully supplied with nature's gifts. It is officially believed that were the more productive measures of British Burmah worked upon an improved European system, instead of by ancient native processes as now, the experiment would be found to pay very well in the long run, despite the higher value of labor there, in comparison with other sections of Her Majesty's Eastern dominions. Almost all the commoner known metals and minerals exist within its narrow confines, being frequently met with in quantities sufficient, apparently to be worth excavating, while—and this is perhaps the most important consideration of all—coal is found plentifully in all the chief mineral-producing districts. The geological structure of the country shows three distinct sections, nearly corresponding, it is said, with the divisions of Arkan, Pegu, and Tenasserim. The former produces limestone, coal and petroleum oil; Pegu, laterite, or brick earth, together with iron ore and manganese; while the eastern division abounds in tin, lead, gold, antimony, graphite, coal and limestone. Galena has likewise been found at Teelawlay, near the junction of the Amherst, Shwaygyin, and Salween districts, one mine of this metal having been profitably worked for some time past. Antimony is mostly found in the East Karennie hills, in Salween, and at Gaing-Ateran township, in Amherst; also in the Toungwaing mines near Moulmein, where it occurs disseminated in small grains through the rocks. From the latter mines, antimonial ore has already been extracted. In the Tavoy district some remarkably fine iron deposits are known to exist. From these large quantities of ore were formerly extracted, while, as boding well for their ultimate future, it may be added that an extensive and easily accessible coal field has recently been discovered in close contiguity. There are other iron mines at Thanzeik, now unworked, with coal in convenient proximity; while in Ava, past the British frontier, the extraordinary rich fields of Sagain are met with. It was here the late King of Burmah erected machinery for smelting and reducing ore; but although the works were of the then most approved style, nothing further has been done towards producing iron; and the people of Upper Burmah still rely upon the imported article. Here, again, coal is ready to hand. About fifty miles north of Mandalay some beds were traced by Dr. Oldham, of the Geological Survey; while comparatively recently Mr. Bryce came across large quantities in the Chindwin river, at some distance beyond the British frontier. The tin mines near Mergni are too well known to require recognition here otherwise than by name; suffice it to say that twenty-eight mines have been opened, though so far they have only been worked by Chinese immigrants in a most desultory fashion. Coal is plentiful in this place also, large workable deposits having been explored at a short distance up the Tenasserim river. Gold is produced in minute quantities at Shwaygyin, once famous for its diggings. The Thayetjundat, which flows into the Shwaygyin, brings down with it a certain amount of auriferous sand. But, unhappily, the search for the quartz reef from which the river gold is presumably derived has hitherto proved unsuccessful; nevertheless, hopes of its early discovery are still confidently entertained. However, where the best chance presents itself is in the district now being opened up by the States railways. The Irrawaddy Valley line from Rangoon to Prome intersects the rich Myamoung coal levels, besides passing within a reasonable distance of the Hensada beds. As iron ore has been traced in many places along the route of this railway, especially in the vicinities named above, there exists every natural inducement to the building up of a great industry. Moreover, the Rangoon and Toungoo line will pass through a metalliferous and carbonaceous region, and here again mining is likely to develop eventually to a large extent. Another point, however, has to be considered as bearing upon the problematical chances of these iron fields being shortly worked. Until now wood fuel has been exclusively used upon the Burmese railways, but vigorous attempts are now being made to obtain a cheap indigenous coal supply, and should the government engineers meet with the success they anticipate either in Myamoung or Hensada the neighboring iron mines are sure to come in for their fair share of attention on the part of private capitalists. In short, it would appear that, in developing the mineral resources of this province, English enterprise may find one of its best opportunities.—Iron.

the practicability of employing coal at all will often be determined by this one quality of clinkering of the ashes. In all such circumstances such coals are best, the ashes of which are of a nearly pure white color, and, with a large amount of silica and alumina in their composition, contain little or no alkali, nor any lime nor oxide of iron. In general it requires a high temperature to fuse these ingredients when taken by themselves; but the presence of oxide of iron tends to lower the point of fusion, and thus increases the difficulty.—Exchange.

Forty-five.—Something like a year ago the Bald Mountain Company started gangway 45 from their main tunnel at a point 1000 feet south of the Ruby Co's south line. The gangway was run on a course a little north of east a distance of 950 feet, at which point a shaft was sunk to a depth of 100 feet. A drift has been run to the eastward some thirty or forty feet, but owing to the amount of water encountered work was suspended and gangway abandoned. No large body of gravel was found, but gravel encountered was well washed. A fair prospect was obtained. The Lowell Avenue tunnel is eight feet lower than the lowest point reached by the shaft, which will enable them to bottom the channel with a tunnel if they desire to do so. The channel is supposed to be the same that was worked by the old Extension at Rock Creek.—Mountain Messenger.

The Sitting Bull Smelter at Black Hills produced \$63,287 in base bullion from a ten days' run. It is said that the smelter will remain idle for the rest of the season, as with the addition and improvements to the mill, all ore can be handled by the new works, which will be ready by the 1st of June.

In the Salmon River country there is nothing specially new to report, but the preparations for an active season and the prospects for it, are better than ever before.

It is said that the Homestake Mining Company of Black Hills will erect a 200 stamp mill. It was only a few years ago that a sixty stamp mill was the largest in that camp. Then came an eighty stamp, and afterwards two 120 stamp mills. The rumor indicates a permanency in mining in that section which is gratifying to note.

THE ENGINEER.

Two New Trans-Continental Roads.

It is reported that the engineering corps of the Atlantic & Pacific railroad, at the Needles, have received instructions to move their outfit across the Colorado river at once and begin operations on the line, thence through Cajon pass to Colton. It will be borne in mind that when the Atlantic & Pacific reached the Colorado river, a short time since, they were met by the Southern Pacific with a road from their Mohave station, which brought the A. & P. to a halt. If the above rumor proves true, it means that the A. & P. intend either to go to San Diego and put on a line of steamers thence to San Francisco, or that they will turn to the west, near H. J. Lomb, and reach the Coast range at or near Point Conception, and thence along the coast to San Francisco. This would form an opposition road to the Southern Pacific.

Again, it is reported that the Denver and Rio Grande, which is already at Salt Lake, thereby completely flanking the Union Pacific, have determined to continue their line from the southern point of Salt Lake westwardly direct to San Francisco. If both of these projections are carried out we shall soon have three lines in full competition for the great and growing business of California, and one of them a double line.

THE RAILWAY MILEAGE OF THE WORLD.—The following is the estimated railway mileage of the world, January 1, 1883:

Miles.	Miles.
United States.....113,000	Australia.....3,200
Europe.....109,000	Africa.....2,200
Asia.....8,000	Mexico.....2,100
South America.....7,000	Canada.....8,500
	Grand total.....253,000

These figures are not claimed to be exact. It is absolutely impossible to obtain official returns for the same period, within a year after or two after date; and so it is necessary to use the latest available statement and add the probable increase since that time. Europe and Asia are a great deal older than the United States, but the latter country has about as many miles of railway as both the former continents. If Canada's and Mexico's mileage were added to that of the United States, the aggregate would be more than the total for Europe and Asia.

BUSINESS FOR THE FLORIDA CANAL.—The proposed Florida canal, the New Orleans *City Item* claims, would secure a greater tonnage than that now passing through the Suez, or likely to pass the Panama canal when or if the latter is completed. Vessels passing through the Suez canal are now charged \$2 per ton; those passing through the Panama canal will be probably charged \$2.50, but it is estimated that twenty-five to thirty cents per ton would yield a handsome return on the capital necessary to construct the Florida canal, as there are no engineering difficulties, and on the Florida canal the tonnage passing through it would amount to 6,000,000 of tons annually. The New Orleans Chamber of Commerce has endorsed the scheme, and the *Item* believes that the capital will be secured without difficulty.

GUARDING AGAINST ACCIDENTS.—A commendable thing is now being done by the Central Pacific in equipping 7,000 freight cars and 200 engines with the Westinghouse automatic air brake. It is claimed for them that they apply themselves in case of accidents. The pressure is not put on from the engine, as is the case with the simple Westinghouse air-brake used on the passenger trains, but from a reservoir under each car. The engine prevents the pressure being applied, but let the connecting hose be broken or cut loose and the pressure from the reservoir locks the wheels by brakes. The improvement is of especial value on the mountain grades, and by making the control of the train easier, will enable greater speed to be made and be a safeguard against accidents.

A WOMAN'S KNOWLEDGE OF ENGINEERING.—A resident of Trenton says three or four years ago it was found that certain shapes of steel and iron work were required for the East River bridge, such as no mill was then making. This necessitated new patterns, and representatives of the mills desiring to bid for the work went to New York to consult with Colonel Roebling. They were greatly surprised when Mrs. Roebling sat down with them, and by her knowledge of engineering helped them out with their patterns and cleared away difficulties which had for weeks been puzzling their brains. Mrs. Roebling, a day or two since, passed over the bridge in her carriage, the first vehicle to make the transit.

WOOD RIVER is about uniting with the rest of the country in the iron bands of the railroad, the track being completed to Hailey a week or so ago, and nearly to Bellevue by this time. The mines of that country are mainly in gold, enterprising hands, and they will make a record of production this year that will give the country a hotter name than anything that has been or could be said of it.

THE SECOND SUEZ CANAL has now taken definite shape. The Company have announced that they propose to commence the cutting forthwith, and have applied to the English government for their support in obtaining the necessary concession of land from the Kedive.

USEFUL INFORMATION.

Improved Process of Making White Lead.

In the United States the manufacture of white lead, is conducted according to the Dutch method. Plates or gratings of lead are exposed to the fumes of vinegar, in vessels set in tan, or stable manure, which acts as a hot bed to warm and volatilize the vinegar. As the lead is corroded, it becomes covered with the carbonate, which is removed with hammers and ground. The process is tedious, slovenly and unhealthy, and many attempts have been made to improve it, but none of them have yielded a product equal to that which results from corrosion. Microscopically examined, the carbonate of lead formed upon the metal, is found to consist chiefly of minute crystals, which are hydrated, laminated and transparent. These are mingled with a smaller quantity of exfoliated particles of the carbonate, which are opaque. These particles, it is claimed, impart to the white lead its remarkable power of resinifying oils, as well as what the trade calls its body, i. e., its property of completely covering objects painted with it. By the new process workmen are not required to detach by hand the carbonate from metal which remains uncorroded, and the product is said to consist almost exclusively of the valuable opaque particles. To effect this, the lead is first brought to the porous or spongy form, by which the surface, exposed to the slow carbonating process, is enormously enlarged, the thin mass being seemingly composed of open interlaced fibres. This is put in a close chamber, and there exposed to a mixture of atmospheric air, carbonic acid, and the vapor of acetic acid. The carbonic acid, generated by combustion, is cooled and purified before it is driven into the chamber. The air passes in warm, and care is required to maintain the proper degree of moisture. The carbonate is the shape of the metal upon which it is formed, and the material is not removed until the corrosion is complete.

RUBBER STAMP INK.—The following proportions are said to give an excellent ink, which, while not drying up on the pad, yet will not readily smear when impressed upon the paper: Anilin red (violet), ninety grains; boiling distilled water, one ounce; glycerine, one half teaspoonful; molasses, half as much as glycerine. The crystals of the violet dye to be powdered and rubbed up with the boiling water, and the other ingredients stirred in. Another indorsing ink, which does not dry quickly on the pad, and is quickly taken by the paper, can be obtained, according to the *Papier Zeitung*, by the following recipe: Anilin color in solid form (blue, red, etc.), sixteen parts; eighty parts boiling distilled water; seven parts glycerine, and three parts syrup. The color is dissolved in hot water, and the other ingredients are added whilst agitating. This indorsing ink is said to obtain its good quality by the addition of the syrup.

VALUE OF THE SUNFLOWER.—Agriculturists claim it is the best egg producing food known for poultry, keeping them in a thriving condition, and largely increasing the production of eggs. Every poultry raiser who tries it will find that this seed is the best food known for glossing the plumage of fowls, and is almost indispensable to those who want to fit their birds for exhibition to the best advantage. The Russian sunflower is easily raised, requires very little care, can be grown in fence corners, or other places difficult to cultivate. Its production of seed is immense, yielding often at the rate of one hundred bushels to the acre. It should be planted in hills, four feet apart, any time from the 10th of May to the 1st of July. Three quarts of seed will plant an acre.

SILVERING GLASS.—Professor Palmieri has devised a process for silvering glass by means of the reducing action on the salts of silver, which is said to have the advantage of producing a very brilliant metallic deposit. When into an ammoniacal solution of nitrate of silver is poured, first a little caustic potash, and then a few drops of glycerine, the reduction begins at once; and this action is accelerated if ether or alcohol be added to the mixture. A moderate heat and darkness are said to increase the brilliancy of the precipitate, and darkness also favors the adhesion to the mirror of the deposits.

CLEANING GLASS VESSELS.—For cleaning glass vessels, Herr Muller recommends the use of quartz-sand and (especially for vessels meant to hold drinks) lead-shot, and recommends gypsum (without silicate) and marble, also bruised bones. Where it is desired to clean glass and porcelain vessels thoroughly, of organic matter, a mixture of sulphuric acid and bichromate of potash is best.

BETTER THAN HEMP.—The mescal, from which the Indians manufacture saddle blankets, is said to be better for making ropes than hemp. Thousands of acres of the article grow wild in San Diego county, says the *San*, which could be converted into ropes.

PROTECTIVE COATING FOR IRON.—A varnish composed of 120 parts of mercury, 10 parts tin, 20 parts green vitriol, 120 parts water, and 15 parts hydrochloric acid of 1.2 specific gravity, furnishes a good coating for iron exposed to the weather.

Incombustible Paper.

Mr. G. Meyer, at a recent meeting of the Societe d'Encouragement, exhibited a new paste combination designed for the manufacture of incombustible cardboard or paper of all sorts and shades. The inventor did not wish to make known at the time the chemical composition of this paste, and also of a new ink exhibited with it, as the patents that he had applied for in Germany and America, had not yet been obtained. He made known the fact, nevertheless, that asbestos was the principal thing employed in the manufacture of his incombustible paper.

He presented specimens of writing, printing, engraving, etc., made with his inks of different colors, and also showed a water-color drawing that had been submitted to the fiery ordeal of the potter's furnace. The painting had preserved all its brilliancy and the paper all its flexibility. By request, the inventor for a few minutes exposed to a gas flame a sheet of his paper, upon which he had written with ink of his composition. Neither the ink nor the paper changed. In order to demonstrate by a most conclusive test how great a heat the paper and ink were capable of withstanding, Mr. Meyer then placed a lithograph, fifteen by sixteen centimeters, between two layers of glass in a state of fusion. On removal, the paper was found to have completely resisted the action of the heat, and the engraving to have preserved all its sharpness.

ZINC PAINT FOR CAST OR WROUGHT IRON.—A process of painting, as a substitute for galvanizing, has been invented by Messrs. Nenjeau & Delaite, of Liege. It is specially intended for objects of large dimensions, which cannot well be moved, and therefore cannot well be dipped into a bath of melted zinc. The zinc, when finely powdered, is simply mixed with oil and sealer. In this way a varnish is obtained, which is applied with a brush in the usual manner. A single layer is sufficient, but two are preferable. The coated objects can be left as they are, or bronzed or painted as required.

PAPER FROM MOSS.—A new branch of industry has sprung up in Sweden lately—the manufacture of paper from moss, not from the living plant, but from the bleached and blanching remains of mosses that lived centuries ago, and of which enormous masses have accumulated in most parts of Sweden. A manufactory of paper from this material has begun operations near Jönköping, and is said to be turning out paper in all degrees of excellence, from tissue to sheets three quarters of an inch in thickness.

GOOD MEALTH.

A Household Friend—Flaxseed.

[Written for the Press by I. H.]

Yesterday one of the boys came in from a walk through the fields, with the rather alarming announcement that he had a barley-head or wild oat in his eye. The eye looked red and inflamed and could not be touched without pain. Several ineffectual attempts were made to remove the substance, whatever it might be, by drawing the upper lid back and using a soft handkerchief; but the cause of the trouble could not be reached; it had fixed itself firmly at the back of the eye-lid. Just then I remembered a hint given in some article on accidents, and acting upon it, a single flaxseed was slipped into the corner of the eye, under the upper lid, and allowed to remain there for about ten minutes. Another effort was then made to remove the intruder and with perfect success; it proved to be a grain of wild oat with a long needle-like point. Lubricated by the flaxseed it slipped out with ease, and in a few minutes the pain had entirely ceased and the eye soon recovered its natural appearance.

Then and there I resolved that I would tell the mothers who read the Press, as a similar accident may easily happen to any child at this season; and the prompt use of a safe and easy remedy may avert many serious consequences.

No household in the country should ever be without a supply of flaxseed, both whole and ground, for there is scarcely anything which can be used with greater success by the amateur physician. At least half of the ailments of little children may be traced to cold or to some disturbance of the digestive organs, and in either of these cases a flaxseed poultice is a sovereign remedy.

Pour boiling water on the ground flaxseed, stirring briskly at the same time till it is the consistence of mush, then put it into a flannel bag, previously prepared, apply it as hot as it can be borne, and cover with several folds of flannel. Let it remain until it begins to cool, when it may be replaced by another. In cases of cold on the chest, hoarseness and cough, it often acts like a charm, and also in attacks of diarrhea and pain in the bowels. I have seen a little child, screaming in agony, relieved in a few moments by this safe household remedy, falling into a quiet sleep, and awaking the next morning quite well. Its great recommendation is that it can do no harm, even if it should fail to do good, which is more than can be said of many nostrums confidently prescribed for family use.

Flax-seed tea, if properly made, is also excellent for colds and coughs, and is pleasant enough to necessitate no coaxing of the little ones. Put two tablespoonfuls of the seed into a quart of cold water, set it over the fire, and when it

begins to boil, allow it two minutes by the clock. Then strain, add the juice of a lemon and white sugar to taste. Keep it on the back of the stove where it will be warm, and give a wineglass full at short intervals.

N. B. If you think by having whole flaxseed in the house you are prepared against all emergencies, as you can easily grind it, if wanted, in the coffee mill, just try it; but I would advise you to make the experiment some day when it is not needed, and when you can afford to be laughed at by the shining little seeds as they slip through the mill intact. I have tried it!

WALNUT CREEK.

Everybody's Business.

FACTORS PRESS.—For a practical people the anomalies we eternally perpetrate and perpetuate are astonishing. Professedly we value life at a far higher rate than cash. No fine frees the murderer. We establish costly tribunals to insure condign punishment to the manslayer. Even the filcher of coin has the machinery of the law, at a vast expense, arrayed against him.

The community are agreed that the stealing of goods and the violent taking of human life should be checked at whatever cost.

In the face of all this we allow wholesale theft and murder. This, too, without deprecatory or deprecatory word.

We permit ourselves to be robbed of that which is far the most valuable of our possessions—our health—yea, we endure to be indiscriminately slaughtered by that most detestable of methods—insidious poisoning.

The value lost—disbursed in doctors' fees and drugs and funeral expenses—exceeds tenfold the amount stolen by criminals. The lives lost are tenfold the lives violently taken by convicted criminals. This insidious poisoning we idly and culpably ignore; name it diphtheria or typhoid fever; accuse Providence, excuse self. Retained are the cesspools; retained the contaminated water supply; retained the festering piles of nastiness, not from ignorance, but from sheer laziness. "My brethren, these things ought not so to be."

EDWD. BERWICK.

Carmel valley, Monterey, May 6, 1883.

SEWAGE PERILS.—Speaking of these, the *Popular Science News* has some very sensible remarks. It says: "The vast number of traps, valves, automatic plugs, bent tubes, etc., used in houses have resulted from efforts among plumbers and inventors to meet the difficulties of the situation by the first method. It may be said that some degree of success has crowned the efforts of the mechanics to obviate sewage perils, but the success has been by no means what the gravity of the situation demands. At present there does not appear to be a single mechanical appliance known which effectually, under all circumstances, affords immunity from the return of deleterious gases and disease germs into dwellings." But it goes on to say that a Mr. Mallett, a well-known chemist, has invented a device called a *germicide*, "which most admirably meets an important end. This device is very simple, and consists in placing behind the lid of water-closets a black walnut box, within which is a metallic case holding a mass of crystalline chloride of zinc. This zinc is open to a gentle flow of water, which gradually dissolves it, and it flows into the bowl constantly, night and day, sterilizing the water so that no living germs can pass." This looks very much as if it met and overcame the difficulty.

TURPENTINE IN DIPHTHERIA.—A German, who enjoys a great reputation for veracity and reliability, recommends as a new remedy for diphtheria, oleum terebinthina rectificatum. Children take one teaspoonful morning and night; adults a tablespoonful. In children tepid milk is given after it; it might also be mixed with the same. The effect of this remedy, which has of late been highly praised by different authors, is said to be really a miraculous one. Within all ready half an hour after the administration of the drug, a bright red redness begins to spread from the margin of the diphtheritic exudation, and this redness becomes generally diffused over and taking the place of the false membrane, and the disease is said to disappear within twenty-four hours without leaving the slightest trace. While this wonderful effect is said to be invariably met with when the remedy is made use of at the very commencement of the disease, those who recommend it so highly contend that it is also successful, only less rapidly, in cases that have already progressed for several days.—*Med. and Surg. Reporter*.

OVERHEATED APARTMENTS.—Dr. William A. Hammond warns against overheated apartments. He says: "An overheated apartment always enervates its occupants. It is no uncommon thing to find rooms heated in winter by an underground furnace up to ninety degrees. Fights and murders are more numerous in hot than cold weather, and the artificially heated air that rushes into our rooms, deprived as it is of its natural moisture by the baking it has undergone, is even more productive of vicious passions. It is no surprising circumstance, therefore, to find the woman who sweaters all day in such a temperature, and adds to it at night by superfluous bed clothing, cross and disagreeable from little everyday troubles that would scarcely ruffle her temper if she kept her rooms at 65°, and opened the windows now and then."

MINING SCIENTIFIC PRESS

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W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, June 2, 1883.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Miller's Improved Postal Scale, 389. The Red Scale of Florida and Its Growth, 374. Peterson's Improved Cart; Straightening up Timbers by Wedging, 377.

EDITORIALS.—Improved Postal Scale; Firedamp and Gas Indicator, 389. Passing Events; Less Nomadic; Lime and Powder; New Form of Amalgamator; Improved Quartz Pulverizer; Lands Mineral in Character, 376. Enlarged Issues of the MINING AND SCIENTIFIC PRESS; Mine Timbering; An Improved Two-Wheeled Cart; Industrial Exhibition of the Mechanics' Institute; Bullion Output, 377. Patents and Inventions; Notices of Recent Patents, 380.

CORRESPONDENCE.—Arizona Notes, 370. MECHANICAL PROGRESS.—Proper Use of Belting; Compressing Bran; An Improved Bell Telephone; Manufacture of Machinists' Tools; Large Steel Castings; Testing Scales; California Mechanism; A Needed Invention, 371.

SCIENTIFIC PROGRESS.—Improvements in Secondary Batteries; Science and Religion; The Electric Light in Paris; Sire's Pendulum; An Interesting Discovery; A New Projectile; Magnetization of Iron and Steel by Rupture; An Old Storage Battery Patent; The Geological Society; Still Another New Thermometer, 371.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends and Bullion Shipments, 372.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Idaho, Montana, New Mexico, Oregon and Utah, 372-3.

THE ENGINEER.—Two New Trans-Continental Roads; The Railway Mileage of the World; Business for the Florida Canal; Guarding Against Accidents; A Woman's Knowledge of Engineering, 375.

USEFUL INFORMATION.—Improved Process of Making White Lead; Rubber Stamp Ink; Value of the Sunflower; Silvering Glass; Cleaning Glass Vessels; Better than Hemp; Protective Coating for Iron; Incombustible Paper; Zinc Paint for Cast or Wrought Iron; Paper from Moss, 375.

GOOD HEALTH.—A Household Friend—Flaxseed; Everybody's Business; Sewage Perils; Turpentine in Diphtheria; Overheated Apartments, 375.

MISCELLANEOUS.—Wyoming Mines; The Deep Spring Country; Sampling Mills; The Wood Bus; Vessels of the Truckee Basin, 370. How a Scale Inset Grows; Two California Mines; The Action of Heat on Clunkers; Mineral Deposits of British Borneo, 374.

NEWS IN BRIEF.—On page 380 and other pages.

BUSINESS ANNOUNCEMENTS.

Lithographing—Schmidt Label Company, S. F. Hydraulic Crane—Joshua Bendy Machine Works, S. F. Baker's Horse Power—Pacific Iron Works, S. F.

Passing Events.

The somewhat unusual activity in the mining share market attracts considerable attention just now, and there seems to be a feeling that the Comstock is going to give the mining community an excitement before long. Still, nothing has been developed yet.

Reports from the Lower California gold excitement are very contradictory, but, judging from what is made public, the region is not an attractive one for miners.

The Cour d'Alene gold excitement, which has attracted so much attention in Montana, has quieted down, and it is now believed it was started by a "crank." The mines are now pronounced "a fraud."

There is a good deal of prospecting going on down in the southern part of this State, and many new mines are being opened. At the lower end of the Carson and Colorado railroad line, there are hundreds of men roaming the hills in search of mines. Some of the old districts down that way, are showing signs of returning vigor, and no doubt some very good mining sections will result from the work now being done.

The burning of the Harrison reduction works was a sad blow to Leadville. The works will be rebuilt.

Less Nomadic.

It would seem that one factor of the increasing prosperity, from a mining point of view, of the Pacific Coast States and Territories, is the tendency which has developed for miners to be less nomadic than formerly. At one time men were rushing from place to place wherever mines were found and spending so much time prospecting, that they never developed anything or did any steady work. The roving instinct is of course inherent in the miner, but he is now more judicious than formerly, and it takes more than mere vague rumors to make him "shake the camp" and start off for new regions.

There is a growing tendency among miners, as a class, to go to work and develop claims in good districts, and the result is more prosperous mining camps and increased production. The class of men who wander about from camp to camp, doing a little here and a little there, is disappearing with the old pioneer, and prospectors now look for mines to keep, or sell at good prices—not a bottle of whisky and a mustang, as has too often happened. When placer mines were plenty this sort of thing did all very well, but quartz mining is somewhat different. We hear now of miners building comfortable cabins where they expect to live, and making up their minds to stay by their mines and the camp. They are not to be enticed away on wild goose chases by mere rumors or chance stories. After a couple of partners have sunk a 100 foot shaft and drifted a while, they do not drop the mine causelessly and let their labor go. They are, in fact, sometimes apt to work away too long. They cannot tell when a quartz mine is worked out as they could a placer claim, and they work on, hoping to strike bonanza any time.

It really seems, therefore, that the miners, as a class, are less nomadic than formerly. True, they prick up their ears when placer discoveries, such as were announced on the Yukon river, in Alaska, recently, or the other day in Lower California, Mexico, are heard of. But they wait now for confirmatory reports, and do not drop pick, pan, shovel and claim and leave for the new El Dorado. They are more content to work what they have, if it is worth anything at all. The mining areas are now larger, and the number of miners much greater than formerly. Distances are practically lessened by railroad lines, but all camps are not within the borders of a few States, as formerly. Miners content themselves with less nomadic habits, and more flourishing camps are the consequence.

Lime and Powder.

We have several times referred to the system of "blasting with lime," now being successfully worked in many English coal mines, so as to avoid danger of gas explosions from powder flash. It is found that though the lime is very useful, in many cases it will not always meet the requirements of coal working. What now seems to be wanted is a table of comparisons between the compressed lime and gunpowder, so that a miner may know how many ounces of lime are equal in power to a given quantity of powder. A paper on this subject was read the other day before the Midland Institute of Mining Engineers, by Mr. C. E. Rhodes, who gave the result of some experiments made in the Swallow Wood and Parkgate seams of coal at Aldwarke main, with the newly invented lime cartridges. The experiments commenced in the Swallow Wood seam. This seam, Mr. Rhodes explained, was of a singularly tough character, and it had heretofore been impossible to get it otherwise than by blasting with gunpowder. Record has been kept of every shot, and he was able to state that about 12 tons of coal were brought down for every pound of powder used. For the lime cartridges, 48 feet of coal was holed to a depth of three feet, six inches; eight shot holes were put in five feet apart, and the necessary time was given for the lime to take effect, the sprags were taken out, and the result was that three and one-half tons were brought down for the eight shots. Another experiment, with seven holes drilled, brought down eight tons. This showed that in some instances the lime would not take the place of gunpowder, which was much to be regretted, for some less dangerous explosive than gunpowder was much needed. Experiments had also been tried in the Parkgate seam, which had in some places a sticky top; there the lime worked better, but still would not bring down the coal so well as powder.

New Form of Amalgamator.

In the construction of pans for the purpose of amalgamating and grinding ores which have been partially reduced by stamps, or other pulverizing appliances, it is necessary to keep up a constant circulation of the pulp so that all parts may continually pass beneath the muller and the grinding shoes, so that it may be properly reduced and amalgamated, and this circulation is usually produced by means of wings or other attachments, within the pan, by which to return the pulp to the center above or below the mullers.

A patent has just been obtained through the MINING AND SCIENTIFIC PRESS Patent Agency by Geo. W. Strong and Walter L. Strong, of this city, for a new form of amalgamating pan, in which they produce a more perfect and constant circulation by means of the angles formed by the shape of the pan within which the muller revolves.

The upper part of the pan is made square in horizontal section, and it may be slightly smaller at the bottom than at the top for more perfect action, although the operation may also be carried on in a pan with vertical sides. Through the center of the pan is a hollow core or sleeve, through which projects the shaft which rotates the muller. When the muller is set in motion, the pan being charged with pulp from the battery or crusher, the current will flow radially outward until it strikes the corners of the pan where it will be arrested and thrown back upon itself from above, passing down the center and beneath the muller and grinding shoes.

In order to produce the most perfect circulation the lower corners of the pan are cut inward so as to make corner faces which are flat. This gives the bottom an outline nearly or quite octagonal, with the sides sloping upward from it, so that when the pulp flows out from beneath the shoes it strikes these faces and is thrown upward, so that there will be a strong downward current at the center, while the external current is upward. The angles of the pan interrupt the rotary and centrifugal currents and throw them back toward the center, at the top, and this produces a rapid and constant circulation of the pulp, which is thus compelled to pass constantly beneath the shoes until every part has been subjected to a thorough grinding action, and also contact with the mercury which is contained in the pan.

Improved Quartz Pulverizer.

The MINING AND SCIENTIFIC PRESS Patent Agency has just obtained for James H. Kinkead, of Reno, Nev., a patent on a new ore crusher and pulverizer of that class in which a rotary crushing disk or plate is revolved against a stationary one. The crushing plates are peculiarly ribbed or dressed. On the face of the plate are a number of ribs radiating from the center and increasing in width towards the circumference. The outer surfaces of these ribs are flat, and continue the plane of the disk. Thence they slope to the center, and their edges are also beveled. Between the ribs are formed depressions, in one of which an aperture is made corresponding with an aperture through the muller with which the hopper communicates. There is a similar muller having on its face a flat disk and a concave crushing plate provided with ribs. When the two mullers are brought together the faces of the disks are in close proximity, and also the flat outer surfaces of the ribs on the crushing plates while on account of the concavity of the two plates an interior space is provided with which the hopper communicates.

Ore is fed in at the hopper, and passes through a stationary muller and opening in the crushing plate into the central space formed by the concavity of the two plates. Power is applied to the shaft, and the crushing plate of the muller crushes the ore between its ribs and those of the other plate, and its disk grinds or pulverizes it against the other disk. The ore is finally discharged into a casing or hollow disk, having a discharge opening. The shaft may be adjusted by set screws to force the revolving parts nearer to or further from the stationary ones, to regulate the degree of fineness of the ore. The larger pieces of ore remain within the concavity of the crushing plates until they gradually work down or out nearer to the outer ends of the ribs, where they are crushed more and more, and finally ground to a powder.

The bill passed by the Provincial Legislature of British Columbia, amending the laws relating to gold and other minerals, except coal, has been disallowed by the Dominion government.

Lands Mineral in Character.

Fully ten years ago the Commissioner of the General Land Office issued instructions to the effect that whatever is recognized as a mineral by standard authorities, and is found in such quantity and quality as to render the land more valuable on this account than for agriculture, was a "valuable mineral deposit" within the purview of the Act of May 10, 1872. Rulings to this effect have been held with reference to asphaltum, borax, auriferous cement, fire clay, kaolin, mica, marble, petroleum, slate and other substances. A case has just been decided which determines that land more valuable for its deposit of limestone than for agriculture is mineral land, and subject to sale under the mining laws of the United States.

It appears that the tract in question was returned as mineral by the Surveyor General, and was withdrawn as such by order of the Commissioner of the General Land Office. Upon the petition of Bricky (claiming it to be agricultural in character), it was advertised and sold to him by the superintendent of schools for the county in which it is located. Shortly thereafter, the superintendent notified him of the refusal of the State authorities to confirm the sale, or to take any jurisdiction over the tract so long as the Surveyor General's return remained unchanged, and he was tendered the purchase money he had paid, which he refused to accept. He then applied for a hearing to enable him to show its agricultural character, which the Land Office allowed him. The testimony shows that the tract has little agricultural value, that it lies chiefly upon a precipitous mountain-side, that less than thirty acres—and these constituting several distinct parcels—are susceptible of cultivation or irrigation, and that its chief value consists in a limestone ledge, the stone of which is used as a flux in neighboring smelting works and for manufacturing lime. It seems even that the agricultural claimant at one time made a mineral location on the claim.

The Commissioner of the General Land Office decided that land chiefly valuable for limestone is not subject to entry under the mining laws, and therefore adjudged the tract in question to be agricultural, notwithstanding the ruling of Commissioner Burdett, in the case of Rolfe, that where land was more valuable on account of limestone than for purposes of agriculture, it may be patented under these laws.

The Secretary of the Interior, to whom the case was appealed, reverses the decision of the Land Commissioner, and decides that the tract is more valuable for its limestone than for agricultural purposes. The mineral claimant therefore takes it.

The large falling off in the amount of money coined this year cannot fail to attract attention. The Mint employees have apparently had a very easy time of it. The value of the coin made is not only less, but there is an equally great difference in the number of pieces coined. The amount of Double Eagles coined in the same time last year was only \$3,392,500. There were 14,361,800 cents made last year, against 11,523,900 this year. It is true the Mint have made 2,024,620 Dimes this year, against none last year, and 8,926,440 in 5 cent pieces, against 2,679,800 last year.

A SOUTHERN IMMIGRATION BUREAU.—The Los Angeles Board of Trade is considering the establishment of an Immigration Bureau, the duty of which shall be to secure for Southern California its just proportion of the sweeping tide of immigration about to set in for this coast. The following gentlemen were elected as the committee of five on immigration: Albert Brown, John F. Humphries, J. De Barth Shorb, L. J. Rose and W. H. Workman.

THERE is now in San Francisco a lady, whose presence is well worth remark. She is Prof. Mary Krom, of the Denver School of Mines, and is believed to be the only practical female assayer in the United States. She is on the coast partly for recreation and partly for mineralogical observation.

At a recent meeting of the miners of Jordan district it was resolved that \$20 worth of work shall be done on each and every placer claim of 20 acres, and \$100 worth of work on every placer claim of 160 acres, within 12 months after location, otherwise such claims shall be subject to re-location.

THE completion of the iron bridge of the Atlantic and Pacific Railway over the Canyon Diablo, in Arizona, adds another to the list of high bridges. It spans a dark gloomy gorge. The bridge is 240 feet above the water, and 541 feet long. It weighs 837,130 pounds, and it cost \$200,000.

Enlarged Issues of the Mining and Scientific Press.

It is the intention of the publishers of this journal to spare no enterprise in advancing the future interests of its readers by all reasonable and practicable methods. Among other advances, we contemplate issuing soon several extra sized sheets, especially devoted to different important localities, commencing with the Territory of Alaska.

The contents of this issue will include a well prepared map nearly the size of two pages of the Press; views of several seaports, towns, scenery and other objects of interest. This is a new land, concerning which new information is coming to hand, and its resources are just being developed. Alaska is situated on our own coast, largely drawing her supplies from our own State, and will soon become of that importance to our community which will render it to our advantage to be well posted on all that pertains to the welfare and progress of our neighboring northmen. Our map will show the numerous water courses of Alaska, the means of water communication, the harbors, etc. We shall give a description of all the mining regions so far opened, and in fact such information as is available, and will be of general interest.

Other double editions will follow shortly after, which will be devoted to the special interests of other mining localities.

All these regions possess more or less interest for California and San Francisco. We ship goods of certain kinds from here, and, from a commercial point of view alone, our interests are mutual. Moreover, the advancement of these regions does good to the whole coast, in which we are all interested.

Persons who can contribute information of special or general interest to our readers for these various issues are solicited to send the same as early as possible. If miners will send us descriptions of their mines or camps we shall be very glad to receive them.

As we make this extra effort to advance the interests of all concerned in the places named, we ask that all who can, to favor our enterprise by making the matters more widely known, and the MINING AND SCIENTIFIC PRESS more extensively patronized. The mining literature of the world is comparatively limited. Miners and scientific men especially should be liberal to assist their helpers in a line of publication, which, at best, cannot be expected to be largely profitable while doing strict justice to the highest interests it represents.

The dates of issue of the proposed extra sheets may be varied, if circumstances should demand it, but due notice will be given.

Timbering in Mines—No. 11.

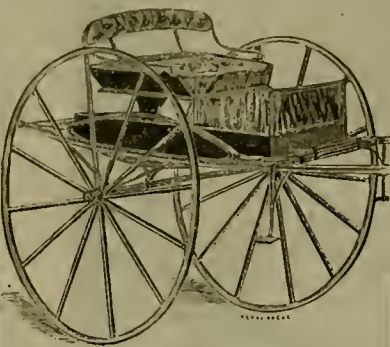
The accompanying engravings show the means employed to move the heel or foundation of vertical timbers when it becomes necessary to do so. It sometimes happens that the movement of the ground cants the timbers. Again, it is sometimes necessary to swedge the timber out at the heel to get solid work. Fig. 1 shows where the wedges are driven, and Fig. 2 shows the same. Fig. 3 is a further illustration of the method of moving the timbers. The wedges are seen between the timber and side wall. The engravings are self explanatory.

SWANSEA.—The old Swansea works, which have for years been a landmark on the margin of Owens Lake, will soon cease to be. For ten days past Mr. Wheeler has had a small force at work taking down the old furnace building, preparatory to the erection of works on higher and more suitable ground. We learn from Mr. Wheeler that it is the intention of the Swansea Company to at once put up first-class smelting works of furnace capacity of thirty tons per day, with every recent improvement.—Inyo Independent.

We see by the Bodie Free Press that the Vevair Copper Works have started up. Good results are expected from the operations of this company.

An Improved Two-Wheeled Cart.

We illustrate on this page a new style of cart patented through the MINING AND SCIENTIFIC PRESS Patent Agency by Mr. Nelson Peterson, of Antioch, Contra Costa county. Of late years considerable attention has been paid to this subject, and the ingenuity of inventors has led to various constructions, having in view the same object, namely, to make a cart an agreeable and pleasant means of conveyance. The many advantages which a two-wheeled vehicle



PETERSON'S IMPROVED CART

enjoys over one with four wheels have been heretofore offset by the single obvious disadvantage of the unpleasant motion which the rider experiences as a result of the transmission of the vertical movement of the shafts (produced by the jogging of the horse) to the axle and body of the vehicle. This results as a necessity where the shafts are secured firmly to the axle, the springs likewise, and the body to the springs. None of the parts have any independence of movement. Any break in the

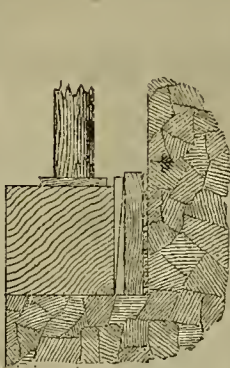


Figure 1.



Figure 2.

STRAIGHTENING UP TIMBERS BY WEDGING.

rigid construction of the parts will accomplish a good result. Accordingly, some have made a spring connection between the shafts and the axle, and others have placed similar devices between the springs and the body. These connections Mr. Peterson deems insufficient and unsafe. He accomplishes the result by hinging the side springs to the axle. In order to limit the movement of the springs when thus hinged, he connects their ends forward and back with the cross bars of the shafts, by means of loosely playing links and intervening metal straps. These allow the requisite independence of the springs and body, while affording a limit to their movement and giving security to the rider. The hinge joint by which the springs are connected with the axle is a model of neatness, simplicity and strength. The shafts are held above and are secured to the axle by means of side brackets, and afford a direct draft for the horse. The body and seat are supported from and by the springs above and have no connection with the shafts, which thus cannot transmit their unpleasant motion any farther than to oscillate the axle, which motion is at once counteracted by reason of the independence of the springs. The vehicle is thus rendered a comfortable and pleasant conveyance. Its entire construction is workman-like. It has no small parts to get out of order, or to rattle. It is strong and durable, and renders as good service as a buggy embodying at the same time the advantages of lightness and economy.

In England it was found that 876 separate fatal mining accidents took place in 1882, as compared to 844 in 1881; causing the deaths of 1,121 persons in 1882, as compared to 954 in 1881; increase in separate fatal accidents, 32; increase in loss of life, 172.

Industrial Exhibition of Mechanics' Institute.

The Mechanics' Institute will open its Eighteenth Industrial Exhibition at the pavilion on Larkin street, Tuesday, Sept. 11th, and it will not close until Saturday, October 13th.

The year promises to be a memorable one to this State, and particularly to this city, on account of the large number of visitors who intend to take part in the Triennial Conclave, of Knights Templar, occurring in the latter part of August. During their sojourn here they will desire to see and learn all that is possible regarding the products and industries of this coast, and will naturally look to this fair for much information and to find the best of the farm, the workshop and the studio. Those who exhibit will have an extraordinary opportunity to show and explain their articles.

In order to stimulate production and invention, and give suitable recognition to meritorious exhibits, there will be awarded, as set forth in the premium list, gold, silver and bronze medals, diplomas, and certain sums in money.

It is the intention of the management to have the exhibition of machinery in motion especially complete, thus enabling visitors to witness the actual production or manufacture of various articles, an exhibit both interesting and instructive. To that end it is expected to have in operation wood-working machinery, for the preparation of wood for building and other purposes; iron-working machinery of the most perfect kind; agricultural machinery and implements for the farm and household; looms for weaving fabrics of wool and silk; boot and shoe machinery, mining machinery, hydraulic machinery, including the largest and most improved steam pumps; apparatus showing the advancement in electrical science; new and novel application of wind power, and many other mechanical inventions of interest and value.

The display of natural products will embrace cereals, fruits and vegetables; and on account of the increasing importance of viticulture, it is expected that the exhibit of grapes and native wines will be large and include all varieties.

For the first time in a number of years the department or mineralogy will be represented,

The Bullion Output.

The Mint Directors' report for 1882 will be issued shortly. It will be a volume of about 600 pages, giving in detail the output of each State, Territory and mine in the United States. It shows a decrease in the production of gold bullion for the year amounting to some \$2,000,000. The principal decrease was in California, where it amounted to \$1,000,000, and in Dakota. There was a small increase in Colorado. There was a large percentage of increase in the mines of the Appalachia range. The mines of Georgia showed an increase of fully 160 per cent, and those of North Carolina gave seventy per cent. The aggregate output from these mines is small, but the increase is so marked that it is expected at an early day to be of considerable importance. The product of silver for the year showed an increase over the previous year of \$2,000,000. The principal increase was from the output of the Wood River district, in Idaho, and the Lake Valley district, in Mexico. The mines of Nevada and Colorado pretty nearly held their own. For the first time in the history of the country there was a shipment of silver bearing ores from North Carolina. In the opinion of the officials of the Mint Bureau, based upon recent investigation, the mines of the Carolinas, Georgia and Virginia are attracting the attention of capitalists who will develop them to a degree unprecedented, and it is believed profitably.

The following tables give the estimate made of the bullion product of California and Nevada, made by the Director of the United States Mint. The product of this State has fallen off, owing to the hydraulic mines not all being at work. Still, the estimate given for Nevada county seems very small indeed:

CALIFORNIA.		
COUNTIES.	Gold.	Silver.
Alpine	\$20,000	\$10,000
Amador	1,500,000	
Butte	650,000	
Calaveras	670,000	
Colusa	300,000	
El Norte	80,000	
El Dorado	600,000	
Fresno	80,000	
Humboldt	100,000	
Inyo	220,000	130,000
Kern	260,000	20,000
Lassen	100,000	20,000
Los Angeles	17,000	24,000
Mariposa	250,000	4,000
Menocino		
Mered	10,000	
Mono	2,220,000	380,000
Nevada	350,000	10,000
Placer	800,000	
Plumas	1,250,000	
Sacramento	400,000	
San Bernardino	20,000	150,000
San Diego	100,000	
San Luis Obispo	5,000	
Shasta	300,000	80,000
Sierra	110,000	
Siskiyou	720,000	
Stanislaus	50,000	15,000
Tehama	10,000	
Trinity	600,000	
Tulare	5,000	2,000
Tuolumne	400,000	
Yuba	710,000	
Totals	\$12,737,000	\$845,000

NEVADA.		
COUNTIES.	Gold.	Silver.
Churchill	\$50,000	\$3,000
Elko	25,000	500,000
Esmeralda	50,000	1,470,000
Farucka	\$35,000	1,700,000
Humboldt	350,000	80,000
Lander	20,000	1,000,000
Lincoln	25,000	430,000
Nye	21,000	230,000
Storey (including Lyon)	920,000	800,000
White Pine	40,000	400,000
Washoe	10,000	17,000
Totals	\$2,376,000	\$8,750,000

THE SILVER PLATED COPPER WIRE hitherto employed soon rubs off and the unwelcome disagreeable red color of the copper makes its appearance in spots here and there. M. M. Comte and De Bary Kroess have used the aluminum alloyed with silver to avoid this difficulty. We learn from the Polytechnisches Notizblatt that Troeltsch and Damschman in their lace factory at Weissenburg, made use of nickel which had been deprived of its brittleness. Fleitman and Witte, of Iserlohn, made the discovery not long since that the addition of a small quantity of other metals would render the nickel so ductile that it could be drawn out into wire of the finest numbers and be scarcely inferior to copper.

MICROSCOPIC INSCRIPTION OF PHYSIOLOGICAL MOVEMENTS.—M. Marey has invented an instrument which enables him to make an exact record of the phenomena of circulation, respiration, and muscular and nervous actions. By employing a fine steel point and a thin layer of lampblack, movements which do not exceed one tenth of a millimeter (.004 in.) are magnified to great dimensions. The apparatus can easily be carried in the pocket.—Comptes Rendus.

GOLD MOUNTAIN.—Guy Thorpe has completed his arrangements for reducing ores in his arrastras at Gold Mountain, in the southern part of Esmeralda county, near the State line, and was to have started up on Thursday last. He has about 15 or 20 tons from three or four different mines, which will be worked as a test. There is an abundance of water and plenty of wood on hand.—Eureka Sentinel.

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Invaluable to those
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For working gold and silver ores by wet or dry crushing. The Stetefeldt, Howell's improved White, Brunton's & Bruckner Furnaces, for working base ores. Rotary Dryers, Stetefeldt improved Dry Kiln Furnaces.

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Water Jackets, either Wrought or cast iron, made in sections or one piece, either round, oblong, oval or square. Our patterns most extensive in use. SPECIAL FURNACES FOR COPPER SMELTING. Slag Pots and Cars, improved form. Bullion and Copper Moulds and Ladles, Litharge Cars and Pots, Cupel Furnaces and Cars.

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Wire Rope, Safety Cages and any Size and Forms of Cars.

Frue Ore Concentrator, or Vanner Mills.

Coarse Concentrating Works, Improved Jigs, Crushing Rollers, Sizers, Trommels, Rittenger Tables, and all other adjuncts for the proper working of Gold, Silver and Copper Ores, complete in every detail. HALLIDIE IMPROVED ORE TRAMWAYS. We refer to Gen. Custer mine, Idaho, 5,000 feet long; Columbus Mine, Col., 4,760 feet long; Mary Murphy mine, Col., 5,000 feet long, all in constant operation.

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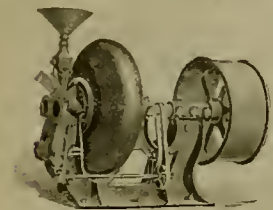
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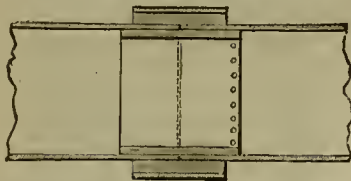
It is simple and not liable to get out of order. Revolving Shell being constructed of Siemens-Martin steel, and all parts mechanical in design and of first-class construction. Weight 6,500 lbs.; heaviest pieces, 1,500 lbs. It will pulverize 7 to 10 Tons in 10 Hours with 30 H. P. For circulars and full particulars apply to or address,

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JOINT FOR SHEET METAL PIPE.

RE-ISSUE PATENT NO. 8,214 TO JOSEPH MOORE AND FRANCIS SMITH.



"The invention consists in connecting the meeting ends of the pipes firmly together and placing a hard or tube around the outside of the meeting ends, which is larger in diameter than the pipes, and which is long enough to extend a distance on each side of the joint and thus filling the space between the outside band or tube and the pipe, with a packing of lead or other soft material, either by casting or tamping."—[Extract from specification of Patent.]

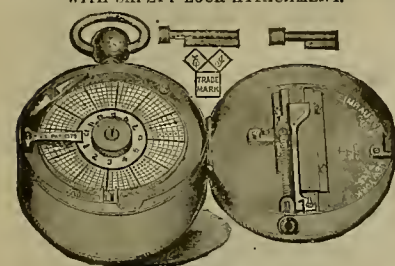
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WITH SAFETY LOCK ATTACHMENT.



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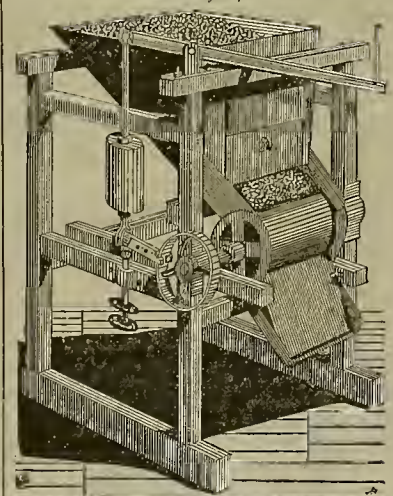
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In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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IRON SLUICE RIFFLE.

I have an Iron Riffle, adapted for Hydraulic, Drift and Quartz sluices, which is a proving very efficient, below everything else. (Cost six cents per pound.) Address, ALMARIN B. PAUL,

Room 20, Safe Deposit Building, San Francisco
The following speaks for itself:

INDIAN SPRING DRIFT MINE, Feb. 23, 1883.
Mr. A. B. Paul—I have tried your Riffles thoroughly, and find them a fine Riffle. They are good with quicksilver or without. They gather the fine gold and rusty gold. I find gold that will not touch quicksilver stops in them, and which glides over 300 feet of sluice above them. I shall try 30 more, and if they save the same amount of gold in four weeks' run, I shall want 100 more. I am not afraid to vouch for them.
B. G. McCLARY,
Superintendent Indian Spring Drift Mine.

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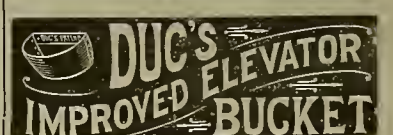
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STEAM CYLINDER AND MACHINE OILS, The Best and Cheapest.

These Superior Oils cannot be purchased through dealer, and are sold direct to consumer only by H. H. BROMLEY, sole dealer in these goods. References—Any first-class Engine or Machine Builder in America. Address, 43 Sacramento St., S. F.

THE BEST IN USE!



This is the only Scientifically Constructed Bucket in the market. It is struck out from charcoal stamping iron. No corners to catch. No seams to burst. No interior corners to clog up. It runs with great ease, and half the power of the old style bucket. WILL OUT-WEAR HALF A DOZEN OF THEM.

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Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

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Philadelphia Chemical Stoneware Manufactory,

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Manufacturer of all kinds of Chemical Stoneware —FOR— Manufacturing Chemists. Also Chemical Bricks for Glover Tower.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

- FOR WEEK ENDING MAY 22, 1883.
- 277,979.—BED OR PILLOW.—Blockman & Evans, S. F.
- 277,982.—AGRICULTURAL MACHINE.—A. Bradford, Dallas, Or.
- 277,989.—WATER JACKET FOR FURNACES.—John H. Canavan, Globe, A. T.
- 277,991.—SPOKE EXTRACTOR.—R. N. Coughell, Shedd, Or.
- 278,004.—SOFA-BED.—B. F. Farrar, S. F.
- 278,123.—WATER HEATER.—H. A. Gantert, S. F.
- 278,010.—PUMPING APPARATUS FOR DEEP WELLS AND MINES.—J. H. Huffer, Jacksonville, Or.
- 278,240.—LIFE PRESERVER.—Geo. P. Hunt, S. F.
- 277,902.—SWING.—Walter Hyde, Oakland, Cal.
- 278,243.—LUBRICATING COMPOUND.—H. E. Lepper, Carson, Nev.
- 278,151.—TRACTION ENGINE.—L. F. Lillard, Dixon, Cal.
- 278,160.—DRY ORE SEPARATOR.—J. C. McCurdy, S. F.
- 278,035.—AMALGAMATOR AND SETTLER.—Fred. Morris, S. F.
- 278,044.—WIRE ROPE RAILWAY.—W. S. Ray, S. F.
- 278,045.—SEWER TRAP.—Geo. A. Reich, S. F.
- 278,189.—BALL COCK.—Wm. Smith, S. F.
- 278,059.—AMALGAMATOR.—G. W. & W. S. Strong, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press American and Foreign Patent Agency, the following are worthy of special mention:

CABLE RAILWAY.—Wm. S. Ray, S. F. No. 278,044. Dated May 22, 1883. This consists in a novel construction of the ropeway and of the gripping apparatus by which the car is connected with the rope, whereby the car may be propelled around curves, or made to cross other cable lines without interfering with them. This is effected by the use of an independent moving device which is placed in the upper part of the cable tube or tunnel where the curve or crossing is to be made, and a mechanism secured to the grip, which will engage with this device when required, the rope or cable being depressed so as to be entirely out of the way at these points.

SOFA BEDS.—B. F. Farrar, S. F. No. 278,004. Dated May 28, 1883. The improvements consist in the means for hinging and adjusting those parts or portions which are intended to fold up or open out—as, for example, the back or heads. The object is to provide a simple and effective means for operating the hinged parts and sustaining them in any desired position.

SPOKE EXTRACTOR.—Robert N. Coughell, Shedd, Oregon. No. 277,991. Dated May 22, 1883. This invention relates to a new and useful device for removing spokes from the hub, and it consists in a peculiar clamping ring fitting the spoke and acting as a lever, and having a fulcrum on the hub, and a means for applying the power at the outer side.

THE Dry Creek bridge below the town of Healdsburg was partially destroyed by fire last week.

FRANCIS D. MOULTON has struck salt near Warsaw, in New York. The well is located on the Rochester and Pittsburgh Railroad, midway between Warsaw and Leroy. Salt was found at a depth of 1,150 feet.

A DEVIL FISH measuring eight feet in circumference, was captured at Santa Monica a few days ago.

WEAK muscles and nerves, sluggishness of thought and inactivity, cured by Brown's Iron Bitters.

ORE PULVERIZER.—The rotary ore pulverizer, advertised in another column as for sale by Mr. Heald, has been used but very slightly, and is a bargain to any one in want of such a machine. It is only sold because the company which ordered it is dissolved, and there is no possible use for it. All the necessary gearing, frame, etc., go with the pulverizer, which can be set running in half an hour after it is received. Parties needing something which will grind ore fine, will do well to communicate with Mr. Heald concerning this machine.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

- G. W. McGREW—Santa Clara county.
- M. P. OWENS—Santa Cruz county.
- J. W. A. WITTEN—Merced, Tulare and Kern counties.
- JAMES G. HOGG—California.
- B. W. CHOWELL—Arizona Territory.
- S. H. HARGOOD—Plumas county.
- M. H. JOSEPH—Kearney, Nev.
- I. M. LEHR—Los Angeles, San Bernardino and San Diego counties.
- A. G. KNOX—Oregon and Washington Ter.
- F. W. STRUTTON—Sierra and Yuba counties.
- J. BARRERA—Yolo county.
- J. W. HOWE—Sacramento county.

Amalgamating Plates.

We saw this week at the silver plating works of E. G. Denniston in this city, five very large amalgamating plates for a mill in Colorado. These are the largest heavy plates that have ever been plated, they being five feet by eight feet—forty square feet of surface on each. The plating is done on heavy copper, and is a very creditable job indeed. The preparation of silver-plated amalgamating plates for catching amalgam, gold and silver, has now become quite an extensive business, and Mr. Denniston having been the pioneer in this line, has built up quite a reputation and trade, shipping his plates all over the country. He has a bath 8 feet long, 6 feet deep and 3 feet wide, specially for these large mining plates. The establishment is now the most extensive one in the United States on this kind of work. They are now filling orders in every direction and competing successfully with Eastern parties. Mr. Denniston has lately enlarged his works, and is now putting in a 25-horse power engine and boiler. The engine is a Westinghouse, made in Pittsburgh, Pennsylvania, by the Westinghouse Machine Company. The works are branching out and will soon have power and room to let. They are very busy now, and mining plates particularly are in demand. Gold, silver and nickel plating in every variety is done. The many years' experience in these lines which Mr. Denniston has passed through enables him to do his work with skill and satisfaction. The personal supervision he exercises over the various departments is one of the prominent factors in the success of the establishment.

A New Bergstrom Organ.

Bergstrom & Co., of this city, have recently finished the construction of a very fine large organ for the First Methodist Church of Oakland. It combines all the very latest improvements, and its exterior finish is of rich but neat design. The upper section is open, exposing the large diapason pipes, which are tastefully decorated in gold and colors to harmonize with the frescoing of the church.

The organ proper is divided into great, swell and pedal, each of which may be operated separately, or all coupled into one. It is provided with two banks of keys, of four and one-half octaves each, and two octaves of pedals. There are 18 stops, as follows:

Swell organ—Oboe, bassoon, flautina, flute traverso, stop diapason, viola treble, viola bass, trumpet and tremolo.

Great organ—Fifteenth, twelfth, flute harmonic, octave, melodia, open diapason.

Pedal organ—Cello, contron.

General—Bellows signal, three sets of couplers, great forte, great piano (the last two worked by the foot), and swell.

The stops of the great and swell organ work directly upon 58 notes each, and those of the pedal upon 27.

The stops are so arranged as to give immediate and distinct response, and Mr. Sam'l Mayer, one of our most skilled organists, speaks highly of this feature. The couplers are adjusted between the manuals, and consist of three sets of two each, one to couple and the other to uncouple, the effect being produced in either case by a mere pressure of the thumb or a finger, which can be done without raising the hands from the keys. These couple the swell and pedal, the great and swell, or the great and pedal. The pedal couplers connect the entire great organ with the pedals, or shunt it off, as the case may be. The swell organ is controlled by the foot, and is so arranged as to remain at any point of swell the operator desires, and without the necessity of securing the pedal. Thus the wing may be entirely closed, slightly opened, half opened, or fully opened, and the foot withdrawn without disturbing the effect. This also is a novel contrivance.

A Backus' water motor is to be supplied to furnish power. The air is first taken into one large bellows, and thence is distributed to six smaller ones, working independently, from which the air presses into the pipes by the action of the stops.

Messrs. Bergstrom & Co., makers of this fine instrument, have an extensive factory in this city where various styles of organs are made. They have supplied many of the churches and Sunday schools of this coast with organs. Mr. Bergstrom has introduced many features of his own invention in the instruments and they are highly spoken of by all who have heard them. This particular organ has an excellent tone, and at both the public and private exhibitions it was commended both by experts and amateurs.

PROF. J. G. LEMMON and wife expect soon to make their summer botanizing excursions to Arizona. Until July their time will be spent mostly in the canyons of the north side of the mountain ranges, where the climate is more comfortable than on the plains. After the early rains, which usually prevail in July, they will leave their wilder mountain camps for the more propitious fields for botany below. The rapidity with which the verdure and flora of the plains spring up and grow after the warm rains is said to seem almost marvelous. We trust our readers may often hear from these faithful devotees of a noble calling, and whom we hope will return in health in due season, with stores of good success.

VIGOR, strength and health all found in one bottle of Brown's Iron Bitters.

News in Brief.

EIGHT THOUSAND emigrants, mostly Mormons, have passed through Hull, England, the past few days for America.

GOVERNOR STANFORD has sent Wild Flower, Hinda Rose, Bonita and five colts to be entered for the Chicago races in July.

THE Northern Pacific Railroad Company has men out in the field examining and appraising land in eastern Washington Territory.

THE once despised lands of Nevada are being rapidly taken up. The sales by the State Land Office since last January have been about 6,000 acres per month.

WHILE riding up the Suislaw River, near Eugene City, Or., the accidental discharge of a gun in the hands of G. Harper killed his son, who was by his side.

THE ship George S. Homer arrived at Portland, Or., yesterday, from New York, 116 days out. She used auxiliary steam thirty days and passed through the Straits of Lemaite.

THE Lower California gold excitement is fizzling out. The gold shipped from there was sold by Indians to Mexicans, and there is no accurate knowledge of when or where it was found.

AN 1,800,000-acre purchase of land in the Panhandle of Texas, by an English syndicate, is reported. The price paid was \$3,000,000. The tract will be fenced. It borders thirty miles on Indian Territory.

At a meeting of the miners of Bear Mountain district, New Mexico, it was decided to call the new camp "Fleming." Miners' wages in the district are \$4 per day.

NORTH BLOOMFIELD GRAVEL M. Co.'s bonds, to the extent of \$50,000, will be redeemed on the 21st. The mine continues to pay largely.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HANKS, State Mineralogist.]

[CATALOGUE.]

4885. Red Porphyry—Rome, Italy. J. S. Hittell.
4886. Green Porphyry—Rome, Italy. J. S. Hittell.
4887. Limonite after Pyrite—Red Hill, Butte Co., Cal. A. B. Paul.
4888. Murex Indivia. Recent Shell, Japanese Waters.
4889. Mineral Coal, used by the natives as an ornament, probably water-worn fragments from the sea beach—Siberian shore of Behring Straits. George Balser.
4890. Crude Copper, product of the Soda Springs smelting furnace—Esmeralda Co., Nev. J. D. Crossman.
4891. Fossiliferous Limestone—Siberian Coast of the Arctic Ocean. George Balser.
4892. Zircon Sand—Hydraulic mine, Irish Hill, Amador Co., Cal. J. W. Loomis.
4893. Volcanic Ash—Tone Valley, two miles from Lone City, Amador Co., Cal. J. W. Loomis.
4894. White Marble—Nine miles north of Lone City, Amador Co., Cal. J. W. Loomis.
4895. Pyrite—Yellow Jacket mine, Esmeralda Co., Nev. C. O. Og.
4896. Durangite—A very rare mineral found in lodes of tin in the mines of Coneto, Durango, Mexico. J. Z. Davis.
4897. Anthracite (?) Coal—Queen Charlotte's Island, British Columbia. M. Toomey.
4898. Copper Ore—Near Romama, Los Angeles Co., Cal. C. F. Allen.
4899. Copper Ore—Ingomar mine, near Luning, Esmeralda Co., Nev. J. H. Crossman.
4900. Pyrolucite—Alameda Co., Cal. Rev. Mr. Briggs.
4901. Chalcedonic Quartz—Dry Creek, six miles northeast of Lone City, Amador Co., Cal. J. W. Loomis.
4902. Talc—Near San Quentin Bay, Lower California, Mexico. J. A. Morales.
4903. Chromite Iron—Near Livermore, Alameda Co., Cal. W. Martin.
4904. Stibnite, Sulphide of Antimony—Paintmill Valley, Inyo Co., Cal. George K. Philips. This deposit has long been known, and may be found located on Atlas Sheet No. 65, D. Wheeler's Atlas, Geographical Surveys and Explorations west of the 100th meridian.
4905. Pyrite—Clipper Coal mine, Lincoln, Placer Co., Cal. John Landis.
4906. Pebbles—Found beneath the coal (No. 4905), Clipper Coal mine, Lincoln, Placer Co., Cal. John Landis.
4907. Bog Iron Ore—Found five miles from Alameda, Alameda Co., Cal. Dr. S. G. George.
4908. Obsidian, variegated—Near McBride's ranch, Mono Co., Cal. J. M. Graham.
4909. Peeten Fossil—Sandstone Bluff, township one north, and on Humboldt meridian, Humboldt Co., Cal. J. M. Graham.
4910. Shell Rock—Sandstone Bluff, township one north, and on the Humboldt meridian, Humboldt Co., Cal. J. M. Graham.
4911. Jeffriesite—Tulare Co., Cal. Wm. H. Randall.
4912. Silver Ore, very rich, showing Cerargyrite—Queen mine, Colton District, San Bernardino Co., Cal. J. Daggett.
4913. Kaolin (pure, prepared)—Worcester Royal Porcelain Works, England.
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4919. Tapa, or Native Cloth of the South Sea Islanders, in five stages of manufacture. John Daggett.
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4921. Water, two galleons—From Goose Lake, Modoc Co., Cal. F. H. Merrill.
4922. Gold Quartz—Gaugre mine, section 32, township 2 north, range 14 east, in the town of Tuttleton, Toluima Co., Cal. George R. Wilson.
4923. Trochus Magnus, Upper Pliocene Fossil—Hills of Asti, Alessandria, Northern Italy.

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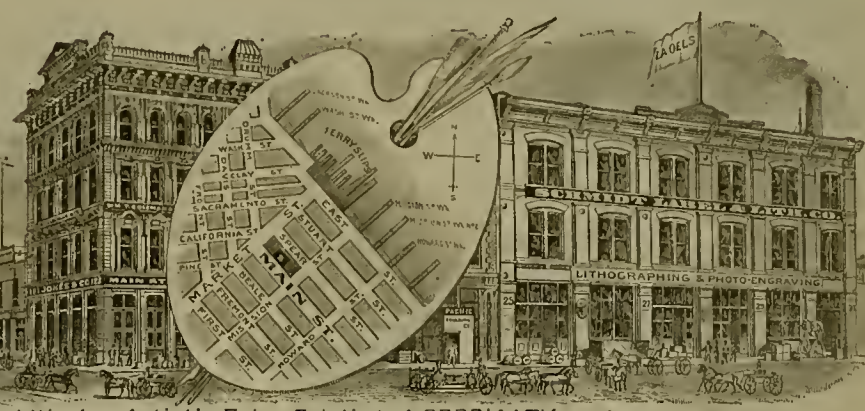
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NOTICE.—There are delinquent upon the following described stock, on account of Assessment No. 2 levied April 10, 1883, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Scott, E. A.	4	10	\$ 75
Warner, Alex.	5	10	75
Martin, A., Trustee	6	5,000	375 00
Martin, A., Trustee	7	5,000	375 00
Martin, A., Trustee	8	5,000	375 00
Martin, A., Trustee	9	5,000	375 00
Martin, A., Trustee	10	1,000	75 00
Martin, A., Trustee	11	1,000	75 00
Martin, A., Trustee	12	1,000	75 00
Martin, A., Trustee	13	1,000	75 00
Martin, A., Trustee	14	1,000	75 00
Martin, A., Trustee	15	1,000	75 00
Martin, A., Trustee	16	1,000	75 00
Martin, A., Trustee	17	1,000	75 00
Martin, A., Trustee	18	1,000	75 00
Martin, A., Trustee	19	1,000	75 00
Martin, A., Trustee	20	500	37 50
Martin, A., Trustee	21	500	37 50
Martin, A., Trustee	22	500	37 50
Martin, A., Trustee	23	500	37 50
Martin, A., Trustee	24	500	37 50
Martin, A., Trustee	25	500	37 50
Martin, A., Trustee	26	500	37 50
Martin, A., Trustee	27	500	37 50
Martin, A., Trustee	28	500	37 50
Martin, A., Trustee	29	500	37 50
Martin, A., Trustee	30	4,000	300 00
Martin, A., Trustee	31	900	67 50
Davis, John A.	32	90	6 75
Martin, A., Trustee	33	5,000	375 00
Martin, A., Trustee	34	5,000	375 00
Martin, A., Trustee	35	5,000	375 00
Martin, A., Trustee	36	4,900	367 50
Kellogg, C. W.	37	100	7 50
Martin, A., Trustee	38	5,000	375 00
Martin, A., Trustee	39	5,000	375 00
Martin, A., Trustee	40	5,000	375 00
Martin, A., Trustee	41	5,000	375 00
Martin, A., Trustee	42	5,000	375 00
Martin, A., Trustee	43	10,000	750 00
Fischer, Bertha C.	44	100	7 50
Cornwall, P. B.	45	4,500	337 50

And in accordance with law, and an order of the Board of Directors, made on the 10th day of April, 1883, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at 528 California St., Room 6, San Francisco, Cal., on TUESDAY, the 5th day of June, 1883, at the hour of 1 o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expense of sale.

A. MARTIN, Secretary.

OFFICE—Room 6, 528 California St., San Francisco California.

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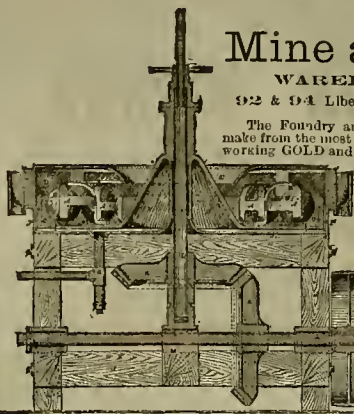
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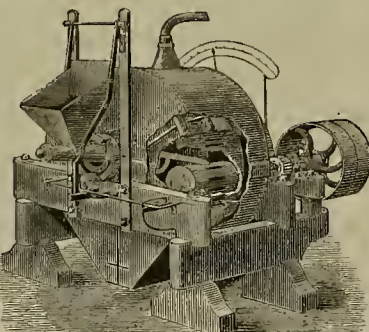
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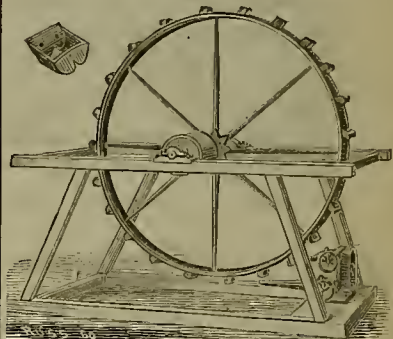
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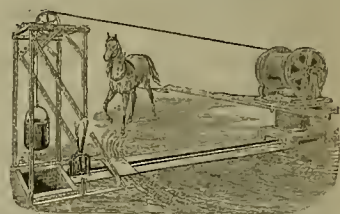
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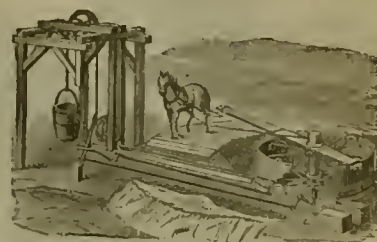
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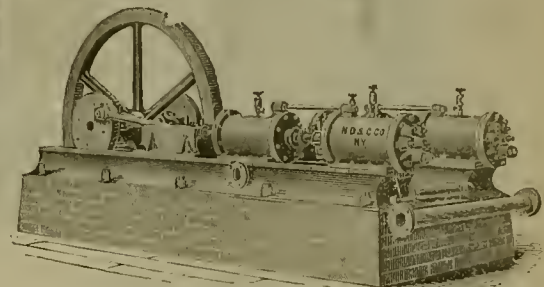
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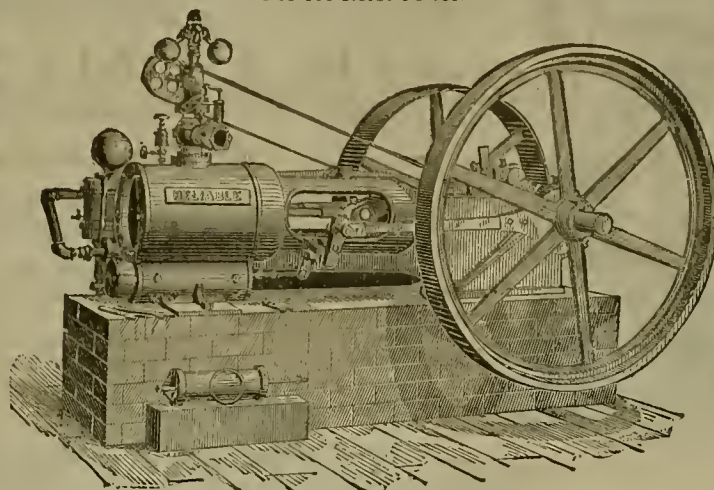
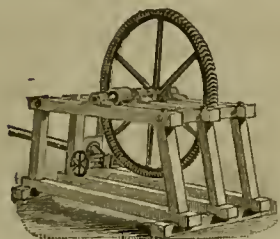
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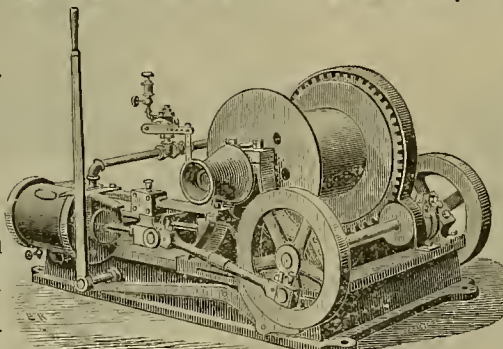
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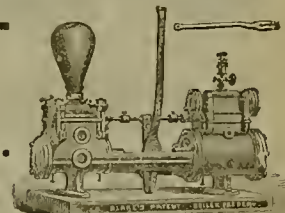
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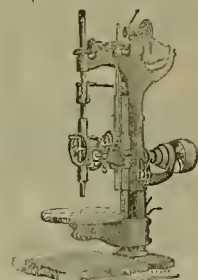
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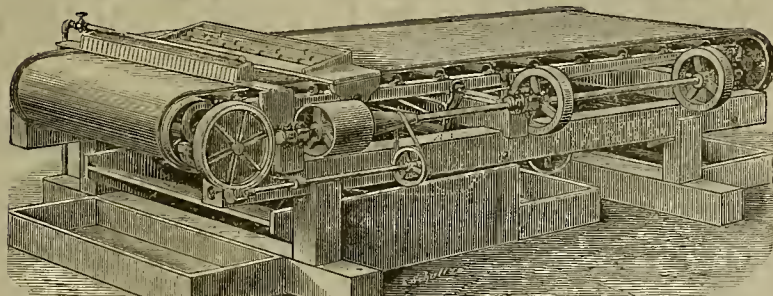
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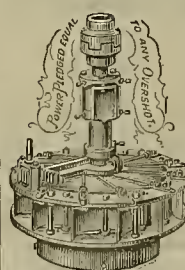
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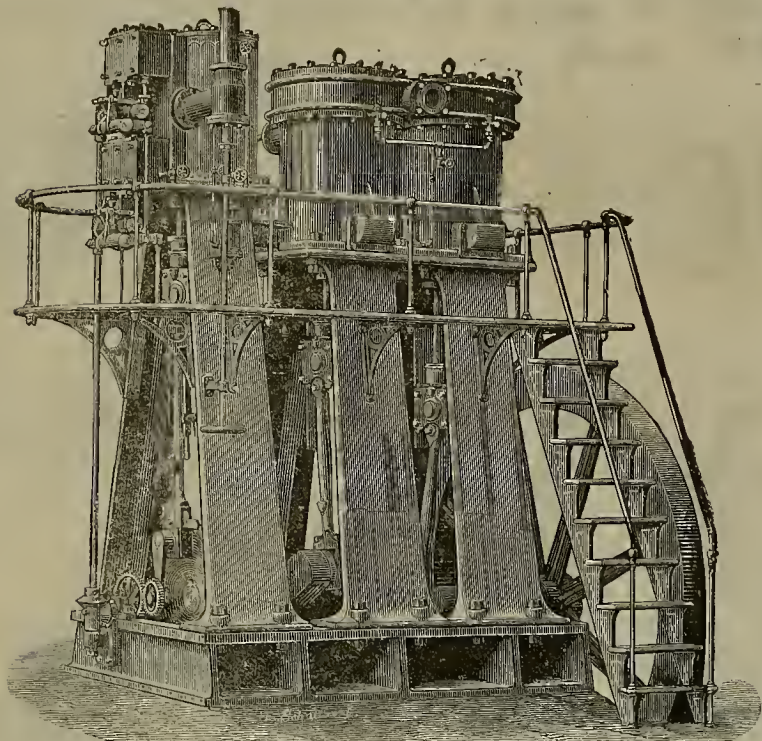
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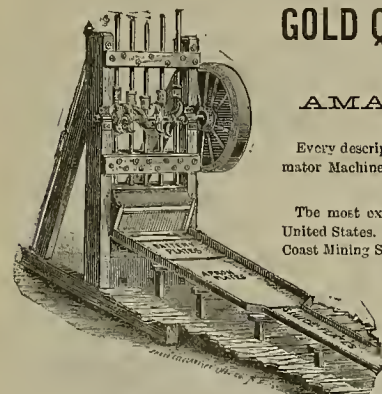
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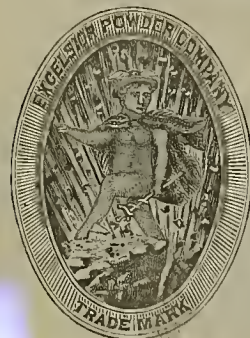
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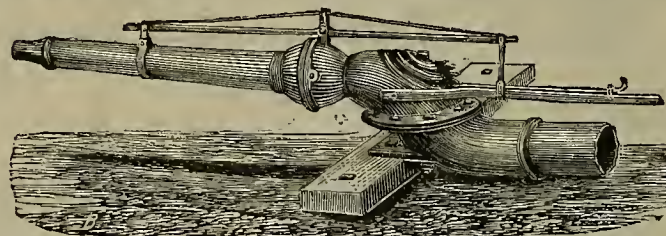
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There is for sale in this city, by I. A. Heald, American Machine and Model Works, 111 and 113 First St., a Rutherford Pulverizer, an improved revolving barrel crusher, which was only used a few times and is as good as new. It will be sold very much below cost, and miners who are in need of such an appliance for a small mine will do well to make inquiries concerning it. It is suitable for a pulverizing mill for powder or other substances. Reference as to above can be had upon applying to this office.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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New Pumping Apparatus for Mines.

The engraving on this page illustrates a new form of pumping apparatus designed by John H. Huffer, of Jacksonville, Oregon, who has patented his device through the MINING AND SCIENTIFIC PRESS Patent Agency. The shaft of a mine is represented with stations at various levels, where pumps are placed. At the surface of the ground, and across the mouth of the shaft is mounted a shaft upon which is secured a pulley. Extending from each of the various stations or levels are short shafts, each carrying double faced pulleys, all of which are here in a vertical plane with the pulley at one side of the shaft.

Clamped upon top of the face of the upper pulley is a flat cable or belt, the ends of which pass over the sides of the pulley and hang down in the shaft. The cable may be a flat wire cable, or a chain, as may be necessary. Clamped to the tops of the next two pulleys, upon their outer faces, are similar flat cables or belts, the ends of which hang down on each side.

Under the three pulleys, upon their inner faces, are clamped flat cables, the ends of which extend up over the sides of the pulleys, and are connected with the depending end of the flat cables alongside of them respectively by round cables or chains, or cords, thus completing the connection between all the pulleys so the oscillation of the driving pulley will oscillate the other three. Tightening nuts and turn buckles take up the slack.

To produce the oscillatory movement a steam engine cylinder is mounted on the surface, and in a frame are two rods or tracks, upon which a traveler is adapted to reciprocate. The end of the piston rod of the engine is connected with this traveler to which it transmits a reciprocating rectilinear motion.

Secured on the shaft is a pulley with three faces. A band or belt is clamped on top of the central face and thence passes loosely around one side of it and under the pulley, and is secured to the end of the traveler nearest the steam cylinder. Two similar bands or belts are clamped to the outer faces, thence pass loosely around and under the pulley in an opposite direction to that of the central band, and are secured to the opposite end of the traveler. Through these bands or belts the rectilinear reciprocating motion of the traveler is converted into an oscillatory movement, with which the pulley is affected. Through the shaft and pulley all of the other pulleys are oscillated. The movement is reconverted into a rectilinear reciprocating motion affecting the pump rods. There are frames and tracks in said frames, and reciprocating travelers at each station where there is a pump.

Secured upon each of these shafts are pulleys having three faces. Bands or belts are clamped upon these faces and pass loosely around them, being secured to opposite ends of the travelers, the arrangement being similar to those of pulley and traveler above. Thus the oscillating movement of these pulleys is transmitted to the pump rods in a rectilinear reciprocating motion to operate the pumps. There are no racks or pinions.

These pumps are supposed to be double-acting pumps, and are connected with each other through suitable pipes and intervening tanks, or in any appropriate manner. Vertical pumps may be also worked on exactly the same principle, with a little different arrangement. One ver-

tical pump is shown in the engraving. The inventor states that this conversion of rectilinear to oscillating motion, and vice versa, while being simple, is advantageous in overcoming the dead-center of crank motion for one half of a circle.

Although the engraving shows the pumping

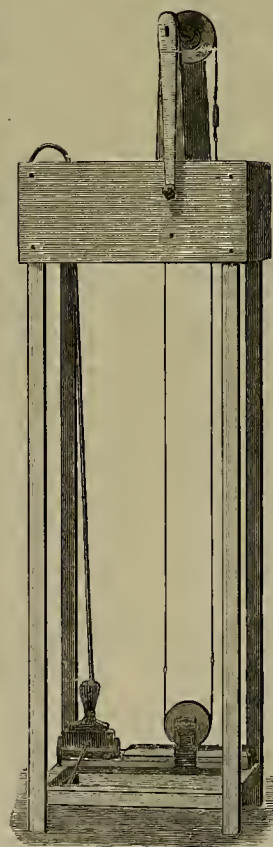
lating pulley, connected through belts and chains with an oscillating driving pulley receiving motion from an engine or a hand-crank, as might be desirable.

The operation of the lift pump has a tendency to throw the system out of balance by the amount of force required to operate it. This



HUFFER'S MINE DRAINING APPARATUS.

apparatus in a shaft of a mine, it is obvious that the same apparatus is applicable to a deep well. In all ordinary cases of this character no stations would be required other than the one near the bottom, where the pump would be supported. This could be in any practicable manner. The principle on which the well pump is operated is shown in the smaller of the two engravings accompanying this article; the details are arranged to suit circumstances. The pump-rod would be reciprocated in the manner already described by the oscil-



PUMP ARRANGED FOR WELL.

may be overcome by adjusting the cut off of the steam engine, allowing it to admit more steam at one end than at the other. When the required depth of shaft is reached, the lift pump may be dispensed with. This apparatus will work at any angle desired by fastening the chains or cables at the center of the pulleys on a line in the new direction. By the use of this apparatus the power is exerted directly against the water to be lifted, less the friction on the bearings, and the inventor is confident there will be no jar in pumping.

Coal Lands and School Sections.

Some little time since, certain miners applied to the U. S. Land Office, to enter certain coal lands in Washington Territory, but the Commissioner of the General Land Office refused to accept the money for the lands, because the land applied for was reserved for the purpose of being applied to the common school funds, under the law establishing the Territorial government of Washington. From this decision the miners appealed to the Secretary of the Interior and, as all the papers were regular, the only question presenting itself was: "Is the land subject to entry under the coal Act?"

On March 22d, 1853, "Congress" passed a law declaring that "sections 16 and 36 in each township of Washington Territory, shall be reserved for the purpose of being applied to common schools in that Territory." The Secretary of the Interior holds that this was a reservation, not a grant, as no granting words were used. The title remained in the United States and the sections remained subject to future disposal of the Government.

These sections then being simply reserved for school purposes and not granted, and the Government having parted with no control over them, it was undoubtedly competent for Congress, in its discretion, to make any other disposition of them it might deem advisable, under whatever conditions it might deem proper.

Therefore, when Congress in 1866, 1872 and 1873 established a system for the disposal of its mineral lands, a system differing widely from all other methods of disposal of public land, a system which provides in terms that mineral lands should be disposed of under its provisions and in no other way, the conclusion is natural that whatever may have been the Congressional intent at the time of the passage of the act of 1853 (at which date the existence of minerals in Washington Territory was unknown), it underwent considerable modification before 1866 and finally in that year signified its changed purpose by the Act of 1866, followed by those of 1872 and 1873.

The Secretary is of the opinion that Congress intended the mining Acts to apply to all public lands of the United States shown to be mineral in character. It is the settled policy of Congress to except from all grants and reservations to State, railroad or other persons all mineral lands in whatever sections the mineral may be found. That such is the policy of the government appears to be very definitely settled by the case of the *Ivanhoe* vs. *Keystone*, recently decided by the Supreme Court of the U. S. In this case no exception on account of the mineral character of sections 16 and 36 could be found in the language of the Act granting said sections to the State of California, yet nevertheless the court held that "Congress did not intend to depart from its uniform policy, i. e., of reserving mineral lands, in this respect in the grant of those sections to the State."

If this principle applies in case of a grant, it would certainly apply with at least equal force to a reservation where the title never passed out of the government. The Secretary concludes, therefore, that mineral land in these sections was reserved from the reservation for the Territory of Washington, and was designed for disposition under the mining statutes of the United States.

FRANK BROTHERTON is running the leaching works of George Nicoll & Co., of San Antonio.

Mining Dividends.

The New York mining papers keep lists of dividend-paying mines standing, and run them from issue to issue, indefinitely. But no two of them are alike, either as to mines or amounts paid, and none of them are complete. The Salt Lake *Tribune* gives a list, as full as it can make it, and suggests that some of the papers in the States and Territories concerned take the trouble to verify the amounts given, and to add such as may be wanting to make a complete list. It will be understood, of course, that there are many mines in all these States and Territories owned by corporations, or by individuals, or firms, which have realized great profits and divided them without any publicity. A case in point is that of the Emma, which, before the mine caved in and otherwise fell into litigation and troubles and perplexities of various kinds, sold 26,651 tons of ore for \$2,581,408. Out of this take the cost of mining, hauling, sampling and selling, which could hardly have exceeded \$15 or \$20 a ton, or, at the outside, \$581,508, and the \$2,000,000 would be profit, and might have been disbursed as dividends. The Flagstaff, well and honestly managed, must have shown an equal or greater profit. Some of the Bingham mines, as the Old Telegraph, the Spanish and the Jordan, which have turned out 50,000 or 60,000 tons of ore each, must have realized a profit of \$10 a ton; and so, in proportion, of the Miller, what is now the Joab Lawrence, the Grizzly and Lornia, Davenport, Prince of Wales, Reed & Beison, Eclipse, Florida, Hidden Treasure, Queen of the Hills, Mono, and some of the mines of Star district. It is hardly likely that the dividends actually declared and paid by Utah mines represents more than one-third, or certainly one-half, of the profits realized from the business during the last twelve years. With these preliminary remarks to indicate what is doubtless as true of other mining States and Territories as it is of Utah, we submit the following lists, arranged from the New York papers.

UTAH.			
Mines.	Total Div.	Last Div.	Am't.
Barbee & Walker.....	60,000	Nov. 1880	10,000
Horn Silver.....	2,300,000	May 1883	300,000
Leeds.....	78,000	Oct. 1878	9,000
Ontario.....	4,925,000	Jan. 1883	75,000
Stormont.....	155,000	Nov. 1881	10,000
Christy.....	90,000	.....	6,000
Crismon Mam.....	100,000	Sept. 1876	10,000
Eureka Hill.....	30,000	Oct. 1879	10,000
Total.....	\$ 7,738,000		
MONTANA.			
Alice.....	\$ 400,000	Dec. 1881	40,000
MEXICO.			
Jocuisita.....	\$ 800,000	Feb. 1883	40,000
DAKOTA.			
Dead-Terra.....	\$ 900,000	Jan. 1883	20,000
Father de Smit.....	570,000	Feb. 1883	20,000
Great Eastern.....	16,000	July 1880	3,000
Homestake.....	1,912,560	Mar. 1883	40,000
Total.....	\$ 3,308,500		
ARIZONA.			
Copper Queen.....	\$ 975,000	Apr. 1883	125,000
Contention.....	2,274,000	Mar. 1883	62,500
Silver King.....	1,230,000	Mar. 1883	25,000
Tombstone.....	1,250,000	Apr. 1882	50,000
Tip Top.....	100,000	Nov. 1881	20,000
Total Wreck.....	50,000	May 1883	25,000
Virginia.....	140,000	Apr. 1882	20,000
Total.....	\$ 5,989,000		
CALIFORNIA.			
Amador Con.....	\$ 480,500	Jan. 1879	15,000
Bodie.....	1,205,000	Nov. 1882	20,000
Bulwer.....	155,000	Apr. 1883	10,000
Excelsior.....	575,000	Oct. 1880	25,000
Gold Strip.....	76,000	July 1881	23,500
Green Mountain.....	212,000	Nov. 1881	9,375
Idaho.....	3,341,250	Feb. 1883	25,000
Inyo.....	45,000	Apr. 1882	6,250
Plumas.....	151,000	July 1879	8,000
Rising Sun.....	52,000	May 1881	11,250
Spring Valley.....	50,000	Jan. 1881	50,000
Standard.....	4,125,000	Apr. 1883	25,000
Total.....	\$ 10,377,250		
NEVADA.			
Argenta.....	\$ 400,000	Feb. 1880	20,000
Belle Isle.....	30,000	Dec. 1879	10,000
Belcher.....	15,397,200	Apr. 1876	104,000
Con Virginia.....	42,933,900	Aug. 1880	162,000
California.....	31,330,000	Dec. 1879	108,000
Confidence.....	78,000	May 1865	12,480
Crown Point.....	11,583,000	Jan. 1879	25,000
Danely.....	56,000	July 1863	21,600
Eureka Con.....	4,817,500	July 1882	50,000
Gold & Curry.....	3,826,800	Oct. 1874	54,000
Grand Prize.....	450,000	Sept. 1880	25,000
Gen. Thomas.....	50,000	Apr. 1880	12,500
Hale & Norcross.....	1,508,000	Apr. 1871	58,000
Independence.....	225,000	Sept. 1879	25,000
Indian Queen.....	365,000	Nov. 1882	25,000
K. K. Con.....	50,000	Sept. 1883	12,500
Kentuck.....	1,252,000	Mar. 1879	9,000
Leopard.....	102,500	Dec. 1876	5,000
Madison Con.....	50,000	Dec. 1879	30,000
Martin White.....	90,000	July 1879	30,000
Meadow Valley.....	1,260,000	June 1873	15,000
Mon. Belmont.....	75,000	Dec. 1873	25,000
Manhattan.....	400,000	Feb. 1877	50,000
N. Belle Isle.....	30,000	Aug. 1881	15,000
Navajo.....	1,000,000	Apr. 1883	25,000
Northern Belle.....	2,975,000	Mar. 1883	15,000
Opbir.....	1,585,000	July 1880	100,000
Ogil Hill Treasure.....	31,930	June 1870	21,333
Raymond & Ely.....	3,075,000	Sept. 1873	60,000
Starr Grove.....	100,000	June 1881	20,000
Savage.....	4,460,000	June 1869	28,000
S. Nevada.....	1,102,500	Jan. 1871	100,000
Yellow Jacket.....	2,184,000	Aug. 1871	42,850
Richmond Con (est.).....	5,000,000		
Total.....	\$138,594,400		

The gross output of Nevada must be nearly three times this sum—say \$350,000,000. The Comstock alone has produced \$240,000,000; Pioche, perhaps \$20,000,000; Eureka, \$50,000,000; White Pine, \$10,000,000; and other districts the rest of it, \$30,000,000. The total of assessments on Washoe mines is about \$72,000,000; other Nevada mines, \$10,500,000; California mines, \$5,572,000; Idaho mines, \$920,000;

Dakota mines, \$865,000; Arizona mines, \$440,000; Utah mines (Leeds), \$87,000; about \$91,000,000. Against this there is a total output, easy, of \$500,000,000. But, of course, the assessments levied do not represent all the money that has gone into the business, probably not more than ten per cent on the whole. The gross output in twenty years of California, Nevada, Arizona, Utah, Idaho, Colorado and Dakota, and Montana would push \$1,200,000,000 very hard, and probably not more than one third of this was net.

COLORADO.			
Amie Con.....	\$ 305,000	May 1880	50,000
Bassick.....	195,000	Apr. 1883	10,000
Breece.....	20,000	Feb. 1880	10,000
Caribou Con.....	50,000	Mar. 1886	10,000
Catalpa.....	210,000	Dec. 1882	30,000
Chrysolite.....	1,700,000	Dec. 1881	100,000
Citrus.....	180,000	Aug. 1880	60,000
Carl Hill.....	10,000	.....	.....
Dunkin.....	200,000	July 1881	15,000
Deer.....	50,000	.....	.....
Evening Star.....	1,225,000	Oct. 1882	50,000
Freeland.....	50,000	May 1880	50,000
Gem.....	21,250	Mar. 1883	2,000
Glass-Pendery.....	251,000	May 1881	25,000
Hibernia.....	137,000	July 1881	120,000
Hukill.....	210,000	Dec. 1878	20,000
Iron Silver.....	1,000,000	Mar. 1883	100,000
La Plata.....	610,000	Sept. 1882	60,000
Leadville Con.....	310,000	Jan. 1883	20,000
Little Chief.....	700,000	Aug. 1880	100,000
Little Pittsburg.....	1,650,000	Mar. 1880	100,000
Morning Star.....	640,000	.....	.....
Moose.....	550,000	.....	.....
N. Y. and Col.....	25,000	July 1879	5,000
Polonia.....	12,000	.....	.....
Prussian.....	132,000	Jan. 1883	15,000
R. E. Lee.....	100,000	Dec. 1882	.....
Robinson Con.....	700,000	Nov. 1881	100,000
Silver King.....	50,000	.....	.....
Silver Chord.....	97,000	.....	.....
Smuggler.....	27,000	.....	.....
United Gregory.....	20,250	.....	.....
Total.....	\$ 10,740,700		

Smelting Ores.

It is not generally known, but still it is nevertheless a fact, that as fine prospects for first-class smelting ores are to be found in Mazourka canyon, opposite Independence, as in any other part of the Inyo range. The Union district has been greatly neglected and overlooked by what few mining men who have visited Owens valley. The idea has got abroad, and it has been fostered by certain parties, that all the good mines and prospects are situated in the southern portion of the county; but this is a mistake, as can be easily proved to any well posted mining man who will take the trouble to spend a day in examining the prospects in Mazourka canyon, under the guidance of a man who is familiar with the locations. It is true that but little work has been done on the claims in this particular section, where the lead ores are mostly found, but that little has shown up as encouraging prospects for good mines as can be found in any other mining district in the State. This statement is based on the opinion of men who have had many years of practical experience in smelting ores, and who have thoroughly examined the district a number of times. The facilities for cheap mining and smelting are unequalled in any other part of the Inyo range, being very accessible, with an unlimited supply of wood for cheap charcoal close at hand, and the mines only about six miles from Independence, and two miles from the railroad and Owens river. The particular section referred to embraces about four miles in length by one mile in width, within which is located some ten or twelve claims, in a formation between limestone, granite and quartzite. An immense ledge, running north and south, with brown iron oxide croppings, which can be seen from a distance of several miles, contains the lead ores above mentioned. On the north end of this belt or ledge is situated the Eagle mine, which shows a fine vein of smelting ore, carrying about forty per cent of lead and forty ounces of silver per ton. This mine has been prospected some, and about thirty tons of ore are now on the dump. Want of means, and some way of selling or smelting the ore, stopped the work. The next claim on the south of the Eagle is the Tubal Cain, showing a vein of lead ore three feet wide, assaying fifty ounces of silver, five dollars in gold, and forty per cent of lead. About thirty tons of this ore has been taken out and now lies on the dump. The ore is a dark brown carbonate of lead, carrying a good percentage of iron, which adds to its value as a smelting ore. This mine is within 300 yards of a good wagon road. The next claim on the south of the Tubal Cain is the Mabel and Emma, with the same character of lead ore, but of a higher grade in silver. A shaft thirty feet deep has been sunk on this mine and considerable ore taken out. Joining on the Mabel and Emma, still south, is the Oneida mine, with two shafts, showing a vein three feet wide, and the same ore as the other claims. The above are only a few of the many good prospects in Mazourka. Many others could be named, showing rich gold and silver ores, which in any other country would create an excitement. It certainly seems strange that parties coming into this valley to look for mines will not even go to look at prospects that any one competent to judge must pronounce valuable when once examined.—*Inyo Independent*.

SINCE the discovery of the Lake Superior deposits, the copper mines of the United States have, until recently, yielded a sufficient supply to meet the demand for home consumption, leaving, also, a large surplus for export.

Thoughts on Prospecting.

A Plain Talk by an Idaho Paper.

The following article, taken from the Bellevue (Idaho) *Chronicle*, will doubtless be read with a great deal of interest by many of our miners and prospectors. It is a correct view of the matter, and doubtless is the experience of every mining town on the coast. We give the article in full:

Mining is of more interest to the *Chronicle's* readers at this particular time than any other topic, so that a plain talk must be permitted to miners and others interested in mines. We do not wish to speak disparagingly of any man's prospect. We know the earth abounds in the highest grade ore to be found in any country. No matter what others may wish to say against Bellevue—no matter how eagerly they wish to speculate in town lots in other places—not a word has been uttered derogatory to our mining resources. We want to be understood at the start, and then the observations made will be taken in the right sense. There are too many prospects held by men who wish to realize a fortune from the mere prospect. A man digs a hole in the ground twelve or fourteen feet in depth and strikes a good deposit of ore. He lays aside his shovel and pick, asks an enormous sum for the evidence he has of the existence of ore, and from that onward does nothing more on the prospect than the law requires. His prospect may be a good one, and with development it may be made a paying mine. But it costs thousands of dollars to develop a prospect into a paying mine, grafting the ore holds out. Owners of prospects must bear the fact in mind that a prospect is not a silver mine. If these prospective mines could be purchased at reasonable figures, it is thought that about 100 would change hands inside of one week in the vicinity of Bellevue alone. Perhaps five men would be put to work upon each one of these claims. In addition to these men already working mines, we would have 400 or 500 more. It would not take long with such a force to develop our mines and start a general boom that would benefit both business men and miners. About four years ago, it will be remembered, a great mining excitement prevailed at Bonanza, Idaho. Prospectors held valuable prospects, and many could have realized fair fortunes from them; but capitalists could not afford to pay extortionate figures for mere prospects. The result is, nearly every one of these prospectors still own their claims, which are practically worthless, and years of time has been lost in waiting for something to turn up. The bird in the bush is still at large.

Of course Bellevue is not like Bonanza, but this matter of holding prospects at enormous prices will have the same effect on the owners. It will have a tendency to concentrate the mining energy into a few of the leading mines, and prospects will remain as such till the owners are as gray as rats. Much depends upon mines falling into lands prepared to work them. To this end, for the good of the prospectors, we suggest that the moral of the Bonanza story be heeded. Realize every cent you can for your property, but it will pay better to sell it than to take the risks incident to the vicissitudes of a mining country.

Gold, Silver, Copper.

Yavapai county, says the Prescott *Courier* is justly celebrated for her rich mines, which hold in place shiploads of the precious metals and unmeasured quantities of the useful ones. Until very recently, shipments of the precious ones have not been very large. Old style mills, erected mainly to work quartz for free gold, were not very successful. Their partial failure gave the county a sore eye, from which it is now fast recovering. Our first quartz men thought of nothing but gold, of which they found a great deal in some ledges. It is but a few years since men discovered that, with the gold, silver was in close communication. Now it is silver and gold. Silver is predominant in all our mines. It is the metal that flows from the Lynx creek smelter in a steady stream, that makes the Silver Belt, the Black Warrior, the Peck, the Alta, the Congar, the Tiger, and the scores of other mines valuable. What makes our silver mines more valuable than those of other localities is the fact that gold is associated with the whiter metal, making the value of our bullion much higher than it would otherwise be. We have just learned, after many failures, how to mine and reduce ores, and nothing can now retard the progress of the country.

Another advance was made when our prospectors discovered ores carrying copper in paying quantities. The mines of Castle creek district, south of Prescott, were, we believe, among the first to make this fact plain. Then came C. C. Bean's discoveries and developments in Copper Basin, near Prescott, where there are acres of copper.

started up a few days ago, has, every day, run out, six tons of copper, which is entirely free from arsenic and antimony. This copper is shipped to Phelps, Dodge & Co., New York City. The Copper Mountain and the Copper Queen mines are, so far, the only ones in Arizona which produce the free metal. As the mine promises to last for many years, we may safely conclude that, to Mr. Stoddard's foresight, sound judgement and economical business habits are our citizens indebted for another paying mine and successful smelter.

The Waterwheel Trials

The test of the Reaction Hurdy-Gurdy Water Wheels at the Idaho mine has been completed some time, says the *Foothill Tidings*, and the result has just been given to the newspapers for publication. The tests commenced on April 30th and continued, in public, until all of the competing wheels had a fair and impartial trial. The Pelton wheel came out victorious, according to the figures, and we believe that all of the competitors conceded that the Pelton was the best wheel. This test at the Idaho will doubtless be the means of establishing the Pelton as the wheel to be used generally. Mr. George G. Allan, at his foundry in Nevada City, is now busily engaged in the manufacture of these wheels, he having orders from all over the State.

In making the tests a prony brake was used on wheels 6 feet in diameter, under a head of 386 feet and 6 inches, the point of connection with the scale beam describing a circumference of 30 feet. In measuring the water to ascertain the cubic feet per minute discharged, a thin plate weir, without contraction, 3 feet and 1/2 inch long, was used, and the J. B. Francis formula for discharge of water over weirs, was adopted as the basis of the calculations. These were made by Mr. George Fletcher, Auditor of the Narrow Gauge Railroad Company, and were as follows:

PRESCOTT WHEEL.				
Weight on brakes, lbs.	Revolu- tions.	Horse- power.	Head of water over weir, inches.	Cubic ft. of water per minute.
444	196	79.2	4.975	163.211
358	290	84.2	4.975	163.211
361	246	80.8	4.975	163.211
339	276	84.4	4.975	163.211
295	281	76.1	4.975	163.211
358	259	84.3	4.975	163.211

Other tests were made of this wheel resulting in an average of \$2,925 horse-power, utilizing 69.6 per cent of the force and impact of the water.

PELTON WHEEL—FIRST TEST.				
Weight on brakes, lbs.	Revolu- tions.	Horse- power.	Head of water over weir, inches.	Cubic ft. of water per minute.
465	254	107.58	4.975	163.211
465	255	107.97	4.975	163.211
400	256	107.05	4.975	163.211
400	256	107.29	4.975	163.211

SECOND TEST.				
Weight on brakes, lbs.	Revolu- tions.	Horse- power.	Head of water over weir, inches.	Cubic ft. of water per minute.
465	256	108.43	4.950	162.98
470	249	108.30	4.950	162.98
490	257	107.68	4.950	162.98
465	254	107.37	4.950	162.98

LOWER NOZZLE.				
Weight on brakes, lbs.	Revolu- tions.	Horse- power.	Head of water over weir, inches.	Cubic ft. of water per minute.
465	257	107.47	4.950	162.98
469	254	107.58	4.950	162.98

STILL LOWER.				
Weight on brakes, lbs.	Revolu- tions.	Horse- power.	Head of water over weir, inches.	Cubic ft. of water per minute.
465	253	106.95	4.950	162.98

HIGH NOZZLE.				
Weight on brakes, lbs.	Revolu- tions.	Horse- power.	Head of water over weir, inches.	Cubic ft. of water per minute.
495	256	108.21	4.950	162.98
465	249	106.26	4.950	162.98

Average horse-power, 107.49, or 9.2 per cent.

KNIGHT WHEEL—FIRST TEST.				
Weight on brakes, lbs.	Revolu- tions.	Horse- power.	Head of water over weir, inches.	Cubic ft. of water per minute.
430	217	84.8	—	152.60
400	232	84.36	—	152.60
400	236	85.8	—	152.60

The cubic inches of water in this test were reckoned on the amount of miner's inches used, allowing 1.40 cubic feet per minute for one miner's inch. This shows 77.18 per cent of the power of the water.

SECOND TEST.				
Weight on brakes, lbs.	Revolu- tions.	Horse- power.	Head of water over weir, inches.	Cubic ft. of water per minute.
490	241	100.78	5.325	180.72
475	204	88.00	5.100	109.35

Average per cent of first test 76.5. Average per cent of second test 71.2. These were the only tests made of this wheel, the nozzles breaking and having none other on hand.

TAYLOR WHEEL.				
Weight on brakes, lbs.	Revolu- tions.	Horse- power.	Head of water over weir, inches.	Cubic ft. of water per minute.
400	184	69.91	4.975	163.211
312½	254	72.16	1.975	163.211

MECHANICAL PROGRESS.

Seasoning Wood.

Wood requires time in which to season very much in proportion to the density of the fiber. But this rule is not without an exception, for pitch pine, which is not at all a densely fibered wood, requires a long time in which to season, even when the process is conducted under favorable conditions. This occurs in consequence of the resinous character of pitch pine, the resin clogging the pores of the wood and thus stopping up the channels through which the moisture would otherwise exude. There are some woods—and mahogany, ebony, and some other of the tropical woods, are of the number—that even in their living state contain very little moisture.

Plants that are of slow growth contain less moisture, when in a living state, than do those whose growths are rapid. A mahogany tree requires 500 years in which to mature, and as a consequence, its texture is exceedingly dense. Being dense in texture, it requires a long time in which to season, and during that lengthened period it shrinks very little. Mahogany should not be kept longer than necessary in the log, because inasmuch as the outside portion of the log contains the greatest amount of moisture, and it being the exposed part, it will, as the wood dries, shrink more than the inner wood, and so, to allow for the outside shrinking, outside shakes will and must occur. The same remark applies with equal force to all log timber, but we name the circumstance in connection with mahogany particularly, for the reason that it is a general practice for some to keep their mahogany logs for a long time in an unseasoned state.

WHAT IS GALVANIZING?—In reply to an inquiry as to the meaning of the word "galvanizing," as applied to iron that has been coated with zinc, the *Manufacturer and Builder* replies that the word so applied is a misnomer, and is misleading to many, who naturally infer that it refers to an electro-deposited coating, as it should do, from the derivation of the word. This journal adds:

There is, nevertheless, some ground for the name, as the protective action of the zinc in shielding the underlying metal from oxidation is partly an electrical or galvanic one. Thus, at the points of contact of the two metals, (iron and zinc), in the presence of moisture a galvanic action is set up, in which the zinc as the electro-positive element of the couple is oxidized, the iron as the electro-negative element being protected. The iron thus coated will remain uncorroded for a very long time. To bring this protective influence into prominence, it will be well to contrast the behavior of tinned iron (made in a similar manner by immersing cleaned iron into a bath of molten tin). Here we have also two metals in contact; but in the presence of moisture they behave very differently from zinc-coated iron. Here, too, a galvanic action takes place between the two metals at the exposed points of contact, whenever moisture is present, but the conditions are reversed. In this case the iron is the electro-positive element, and the tin the electro-negative one; and it is the iron that is oxidized while the tin is preserved. Hence the necessity of painting tinned iron (such as roofs) wherever it is exposed to the weather, as otherwise it would be more rapidly destroyed by corrosion than if the iron were exposed alone, the galvanic action between the two metals serving to facilitate the oxidation of the iron. The name "galvanized," as applied to zinc-coated iron, is, we believe, of French origin, the process, according to Dr. Ure, having been originally patented in France.—*Mechanical News*.

ELECTRICITY.—Indications are multiplying that the electric motor will ere long be substituted for steam upon local railway lines in large cities. At least a vigorous attempt will be made to apply it in that manner, and the question will be settled, for the time being, whether it is a practical and economical agent. Hitherto the examples of its use have been merely interesting scientific experiments, and have left unsolved the great problem of profit and loss, which is the point on which its destiny hinges so far as railway managers are concerned. There is now a strong probability that the electric motor will be practically tested on one of the elevated railroads in New York; and a tunnel railroad under the Thames, in London, is shortly to be built, the trains on which will be drawn by electric engines. Nothing remains to be determined in regard to this motive power, to insure its general introduction, except the vital question, whether it will pay. The other advantages possessed by it are sufficiently obvious to render the public impatient for its speedy and thorough trial.

WET AND DRY COAL IN MAKING STEAM.—A series of tests were made recently at Bochum, Germany, to determine the value of wet and dry bituminous coal in the making of steam. Washed slack, holding 18 per cent of water and 9.9 per cent of ash, evaporated 5.7 pounds of water per pound of fuel; while the same coal, with only three per cent of water, made from eight to 8.5 pounds of steam. Making due allowance for moisture by reducing to a standard of like quantities of coal, free from moisture, there is found to be a direct loss by using wet coal of 14 per cent.

Grading Pig Iron by Grain.

An interesting circumstance which demonstrates the possible error arising from grading pig iron by fracture has been investigated by Mr. Ernest Sjosdelt, chemist of the Shelby Iron Co., Alabama. The *Journal of the United States Association of Charcoal Iron Workers*, in referring to the matter, says that a lot of iron had been selected by the grain only, and graded as Nos. 1, 2 and 3. When remelted and chill tests taken from it, the No. 2 iron showed a deeper chill than either No. 1 or 3, and deep enough for a No. 5 iron.

The practice at Shelby Iron Works is to grade all car-wheel iron by the chill plate, as follows:

Grades of car-wheel iron: No. 1 and 2 show no chill in pig; No. 3 chills one-fourth inch; No. 4 chills one-half inch; No. 5 chills three-fourths to one inch; No. 5½ chills three-fourths to one inch with the air chill; No. 6 mottled; No. 7, white; iron is also assorted by grain.

Poundry iron: No. 1 X, very open grain and soft; No. 1, open grain and soft; No. 2 medium grain; No. 3, close dark gray.

Mr. Sjosdelt made partial analysis of the pig iron of each grade, and the chill tests taken from them are as follows:

No. 1 pig iron contains 1.042 per cent silicon; the chill test, 1.040 per cent silicon.

No. 2 pig iron, .511 per cent silicon and .612 manganese; chill test (a), .486 per cent silicon, and .576 manganese; chill test (b), .495 per cent silicon, and .535 manganese.

No. 3 pig iron, .920 per cent silicon, and .540 manganese; the chill test, .749 per cent silicon.

What was graded as No. 2 pig iron, therefore, corresponded in its chemical constituents with a Shelby No. 5 (the average amount of silicon of which is .65 to .45 per cent), and, as the manganese is neither unusually too high nor too low, and the surface of the pig has all the appearance of a high grade iron (being much more honeycombed than sample No. 3), the fact of its high chill is quite natural.

The No. 2 pig iron was selected on account of its open grain, it showing a fracture between Nos. 1 and 3.

A DIFFICULT THING TO UNDERSTAND.—One of the most difficult things to make an ordinary mechanic understand is that two things cannot occupy the same place at the same time. It is consequently a never ending source of wonderment to him when he finds that lace, a gelatine film, or a pressed flower, can be made to give an impression in lead, or even in soft steel, when passed between the rollers of a transferring press. That the soft substance can indent the hard one taxes his credulity to the utmost, and when he sees the work done he is ready to disbelieve his own eyes. When such a man finds the print of a hair on his cold forging, or a thousand and one other instances illustrating this fact that two substances cannot occupy the same space at the same time, his wonderment exceeds all bounds, and yet, though slow to believe such a demonstration as this, it is easy to accept the fact that a little water on the piston may be sufficient to smash the cylinder or blow off the head, which is only another illustration of the same fact.—*Mechanics*.

NEW ZEALAND IRONSAND.—Ironsand works for the manufacture of iron sand into iron have recently been completed at Onehunga, on the west coast of New Zealand. There are scores of miles of iron sand in that colony, but notwithstanding the high percentage of iron which the sand contains, all attempts to render remunerative the manufacture of iron from it have hitherto failed. Excellent steel has been produced from the sand, but the process of manufacture was found to be too costly. Recently, however, machinery has been imported from the United States, and it has been found that, with the aid of this machinery, the sand can be worked cheaply. Mr. W. H. Jones, formerly of the Rockaway Ironworks, New Jersey, has been appointed manager to the new Onehunga works. It is proposed at present to manufacture only bars and iron wire, but the manufacture of hoops, sheets and plates is to be undertaken. The plant on the ground at present consists of a furnace 32 feet in height, a reverberatory puddling furnace with a deoxidiser over it, in which the sand is deoxidised by the waste heat from the puddling furnace, and a separator. The iron sand is brought by sea from the Manukau Heads, and is, in the first instance, taken to the separating shed, where, by the aid of magnets, the iron is separated from the other foreign matter and they fall into separate shoots. The iron sand contains from seventy to seventy-five per cent of pure iron after the separating process, but it is estimated that five per cent is still left in the refuse, which is partly beach sand, with a small percentage of titanium. The iron sand thus cleansed is then hoisted to the top of the furnace, into which it is introduced by a number of small openings into a series of retorts, where it is subjected to heat, causing the oxygen to be expelled from the iron, thereby reversing Professor Bardi's invention of coating iron with black oxide. After the expulsion of the oxygen, the sand is in a wrought metallic state. Upon opening a valve any required quantity of red hot sand is run into the puddling furnace, where the carbon is burnt out of it, after which the iron is treated as in an ordinary puddling furnace, blooms being taken from the furnace and finished.

SCIENTIFIC PROGRESS.

Some Examples of Chemical Synthesis.

But a few years ago the determination of the exact composition of a body was regarded as the highest application of chemistry. Especially was this the case when the body was organic. To separate it into its elements, bring them into forms to be weighed, and ascertain their precise quantities and proportions, was the most refined process of the chemist's art. That he should combine these elements, and with them create bodies similar to those belonging to the organic kingdom, was regarded, even by the fathers of the science, as too much to hope for. And yet, that is just what is being done to-day. The application of the processes of analysis brought chemistry much renown, and made it an exact science. By the application of the processes of synthesis, the chemistry of the laboratory usurps the functions of the chemistry of vegetation, and creates the important products of agriculture, madder and indigo, out of their elements. The study of chemical synthesis is, therefore, incumbent on the student. Let us take one of Mr. Edison's incandescence lamps as mounted and ready for use. The fine bow of carbon within the glass globe is in the midst of a vacuum. Now let us surround it with an atmosphere of hydrogen, by admitting that gas pure and dry, seal and put the lamp in circuit. If the electrical current is strong, the carbon will glow for a moment and then disappear. It has combined with the hydrogen and formed a hydro-carbon, which is aciform and transparent, therefore invisible. By means of well known tests, this aciform compound is proved to be acetylene, the composition of which is equally well known. In order to form it, the atoms of carbon and of hydrogen have arranged themselves in twos, thus: C₂H₂. Carbon and hydrogen, members of the mineral kingdom, have united to form acetylene, an organic body and a constituent of illuminating gas. Now, as acetylene can be converted into olefiant gas, C₂H₄, and then into alcohol, C₂H₅O, it follows that alcohol and its numerous derivatives may be classed among the products of the chemical synthesis. But they by no means comprise the only class. Were we able to heat the globe containing the acetylene, and maintain it at nearly the fusing point of glass, the molecules of acetylene would, so to speak, form themselves into groups of three, which may be represented thus, C₂H₂.C₂H₂.C₂H₂, or, more briefly, C₃H₃, which is benzol, the most important of all the components of gas tar; the point of departure of a host of valuable organic products, including aniline and indigo. The force which coerced the molecules of acetylene into uniting to form benzol, was heat, and the atoms of carbon and of hydrogen were also combined by the intense incandescence of the carbon. The incandescence was caused by a current of electricity, but had it been produced equally by any other cause, acetylene would have been formed. The phenomenon was not electrical, but calorific.

By synthetic chemistry, the gas tar products, represented by benzol, naphthaline, and anthracene, may be converted into the petroleum products, and the relation between the two classes having thus been established, the question whether they are, or are not mutually convertible, at once arises. Fortunately for the great petroleum interests of the country—fortunately for the manufacturers and consumers of artificial dyes—the question is settled in the affirmative. The waste product of the Russian petroleum refineries in the Caucasus, has been there converted into anthracene, and from this anthracene the "Badische Anilin und Soda-fabrik" at Ludwigshafen, manufactured alizarine and sent it to the Moscow exhibition. Naphthaline, which yields magdala red, Martin's yellow, and naphthylamine blues and violets has also been obtained from the residuum in the petroleum stills, and benzol as well, which yields indigo and the group of aniline colors. Such are some of the results directly traceable to the study of chemical synthesis.—*From a lecture by Dr. A. L. Kennedy*.

LIGHT FROM GAS.—The amount of light given out by a gas flame depends upon the temperature to which the particles of solid carbon in the flame are raised, and Dr. Tyndall has shown that of the radiant energy set up in such a flame, only the one twenty-fifth part is luminous; the hot products of combustion carry off at least four times as much energy as is radiated, so that not more than one-hundredth part of the heat evolved in combustion is converted into light.

SEPARATING CITRIC AND TARTARIC ACIDS.—C. Rovera contributes the following to the *Giornal Farm. Chim.* A solution which contains both acids is neutralized with sodium carbonate, and then boiled to expel the carbonic acid. To this is added enough of the original solution of the two acids to make it distinctly but faintly acid. Then a solution of calcium chloride is added, and this precipitates all of the tartaric acid. The filtrate from this precipitate contains calcium citrate, which separates if the solution is boiled.

HOW TO BRIGHTEN CARPETS.—After the dust has been thoroughly beaten out of carpets, and they are tacked down again, they can be brightened very much by scattering cornmeal mixed with coarse salt over them, and then sweeping it off. Mix the salt and meal in equal proportions.

Formation of Arsenides by Pressure.

Spring has continued his experiments on the formation of chemical compounds by simple pressure, and now gives the results obtained with arsenic. When zinc filings and pulverized arsenic, mixed in the proportions required by the formula Zn₃As₂ are submitted to a pressure of 6,500 atmospheres, a homogeneous metallic-like block is obtained, crystalline under the microscope, and brittle under the hammer. It dissolves completely in sulphuric acid, evolving hydrogen arsenide and leaving only a small black residue. A similar mixture of lead and arsenic gives a homogeneous block of metallic luster, hard and brittle, and which does not clog the file. The arsenide of tin corresponding to the formula Sn₃As₄ thus obtained, is a white metallic mass, brittle with foliated structure, fusible at a higher temperature than tin, and difficultly soluble in hydrochloric acid with evolution of H₃As. The cadmium arsenide required three pressings, and gave a brittle metallic mass. No compound of as high a composition in arsenic, Cd₃As₂ could be formed by fusion. Copper combines with arsenic under a pressure only with difficulty. After eight pressings a homogeneous metallic mass resulted, brittle and granular, grayish-white in color. Silver acts similarly, giving a bluish-gray homogeneous metallic mass. Arsenic itself, when submitted to 6,500 atmospheres, acquired a metallic luster and a specific gravity of 4.91.—*Ber. Chem. Ges.*

FORMATION OF CHEMICAL COMPOUNDS BY PRESSURE.—Mr. Spring, the German chemist whose experiments on the formation of solids by pressure were recorded in our columns some time since, has continued his researches, and now gives some of the results obtained. He found that when zinc filings and pulverized arsenic in proper proportions are submitted to a pressure of 6,500 atmospheres, a homogeneous metallic-like block is obtained, which appears crystalline under the microscope and brittle under the hammer. It was found to dissolve completely in sulphuric acid, evolving hydrogen arsenide, and leaving only a small black residue. A similar mixture of lead and arsenic gave a homogeneous block of metallic luster, hard and brittle, and which does not clog a file. Arsenide of tin obtained in this manner is a white metallic and brittle mass, with foliated structure, fusible at a higher temperature than tin, and dissolving with some difficulty in hydrochloric acid. The arsenide of cadmium was submitted to pressure three times, and gave a brittle metallic mass. Copper was found to combine with arsenic under pressure only with difficulty, and after having been submitted to the operation some eight times a homogeneous metallic mass was obtained, brittle and granular and grayish-white in color. Silver was found to give a similar mass, being of a bluish-gray color and homogeneous in structure. Arsenic itself, when submitted to 6,500 atmospheres, acquired a metallic luster and a specific gravity of 4.91.

NEW AND STALE BREAD.—A celebrated French chemist, M. Boussingault, has recently been investigating the nature of the change which takes place when bread becomes stale, something which has hitherto not been understood. In the course of his experiments, a circular loaf 12 inches in diameter, and six inches thick, was taken from an oven heated to 240° Reaumur, and a thermometer forced into it three inches. The thermometer indicated 78° F. (207.5 F.). The loaf was then taken to a room, the temperature of which was 15° R. (66° F.), and found to weigh seven and a half pounds. In 12 hours the temperature of loaf sunk to 19° R. (73° F.), and in 24 hours to 15° (66), and in 36 hours to 14° (63.5). In the first 48 hours it lost only two ounces in weight. After six days the loaf was again put in the oven, and when the thermometer had indicated that its temperature had risen to 55° R. (156 F.), it was cut open and found to be fresh, and to possess the same qualities as if it had been taken out of the oven the first time; but it had lost twelve ounces in weight. Experiments were made with slices of bread with similar results, proving conclusively, that new bread differs from old, not by containing a larger proportion of water, but by a peculiar molecular condition. This commences and continues to change during cooling, but by again heating the bread to a certain temperature, it is restored to its original state. It is the mechanical state which makes new bread less digestible than old. The former is so soft, elastic and glutinous in all its parts, that ordinary mastication fails to reduce it to a sufficiently digestible condition.

LUMINOUSITY OF THE MAGNETIC FIELD.—Professor W. F. Barrett, of Dublin, has been making some interesting experiments to test the correctness of the discovery claimed to have been made by the late Baron von Reichenbach, viz., that a peculiar luminous effect, resembling a faint electric discharge in rarefied air, emanated from the poles of a magnet, and was rendered visible in a perfectly darkened room.

COOKING.—A Montreal firm has invented and patented a machine for cooking by electricity. It consists of a saucepan so isolated by non-conductors that the bottom forms the positive pole of the current. The negative pole is attached to a movable point which travels in circles over the bottom of the pan underneath, distributing the heat over the whole surface and with sufficient rapidity to avoid burning a hole through the pan at any one point.

THE DEADWOOD SHAFT.—*National*, May 29: On Monday we paid a visit to the new works at this shaft, now owned by the California Prospecting Co., and under the management of Mr. E. L. Parsons. The shaft was put down some years ago by the original owners of the Deadwood channel, and a small drift or two runs, and then, through some complications, the engine used in the work was taken away, and of course the work had to be suspended. The ground yielded richly for the amount of labor performed, and it now seems to be in a fair way to be thoroughly opened and worked. A nice little engine is running, which pumps the water and does the hoisting easily. Mr. Parsons has shown considerable ingenuity and mechanical skill in fitting up the mine. The shaft is 68 ft in depth. The "pump" is simply a rubber belt, to which tin buckets are attached every three feet. The endless belt runs into a "sump" at the bottom of the shaft, where the buckets fill and when they arrive at the top, pass over a drum or roller and discharge into a flume which takes away the water. The convenience is novel in shaft-working, but perfectly simple, and highly satisfactory. It is not necessary to run it more than half the time to keep the mine dry. The other compartment is fitted up for a cage, on which the cars, filled with gravel are run, and hoisted to the top, where they run to the washing-dump, conveniently situated, just below the hoisting works. Work has but just commenced in the drifts, and no returns have yet been made, but there is no chance for a failure, as the ground is known to be good, and the channel for many hundred feet has never been bottomed except by this shaft. Messrs. Miller and Flynn handle the engine, and Mr. P. Trayner is the foreman of the mine.

CLAREMONT HILL.—No news of much importance comes from Claremont, except that the prospecting work is being pushed vigorously and every day adds evidence to the fact that a rich and extensive gravel mine is there. The tunnel has developed the pay-gravel for more than one hundred ft across the channel, and it is said to equal in appearance anything to be found in the blue gravel channels of Sierra county. The owners are satisfied with the prospects, and will now put up buildings, etc., for permanent work. No gravel can be washed at present, as there is no lumber for flumes, but the pan and rocker prospects gold in quantities sufficient to prove that Claremont is solid. The hill will be a busy place for years to come, and furnish employment for a large number of men.

San Bernardino.
GOMBLER.—*Calico Print*, June 2: Considerable advancement has been made in this mine within the last few weeks. Besides the clearing away of surface earth on the bluffs, and at the same time taking out a large quantity of good ore, a shaft has been sunk to a depth of 50 ft on the ledge from which ore is being taken, a tunnel has been driven in on the ledge from the south 30 ft, and another on the north, 12 ft. A large quantity of fine ore is taken from these tunnels, keeping a car busy running the ore out to the chute.

BISMARCK. The working force on this mine has been increased to eight men. Work in the shaft is progressing in the midst of good ore. It is Mr. Godfrey's intention to sink the shaft to a depth of 50 ft, then cross-cut and stope ore.

SNOW BIRD. The new cuts recently made in the hill are looking well, the veins opened up getting broader and the quantity and quality of the ore increasing. Out of the numerous veins that can be seen running through the hill there is a likelihood that a permanent ledge will be struck, of which they are lewders. The Coleman Co., who recently bought several borax deposits a few miles east of Calico, have a dozen men at work taking out the borax and shipping it to San Francisco.

Sierra.
RICH BOWLER.—*Mountain Messenger*: A very rich quartz boulder was found in the Nevada claims at Gibsonville, a few days since. The boulder was found lying close to the surface, and weighed 165 pounds. It is estimated to contain over \$2,000. Fifteen hundred dollars was offered for it, but the offer was refused. Cox, Denoon and Gourley are the owners of the claim. The Rainbow company, Chippis Flat, has done remarkably well during the last two weeks, the output of gold going away up into the thousands. The owners are reticent in regard to the yield, but it has undoubtedly been larger than outsiders are aware of.

GIBSONVILLE.—The Union company are still taking out excellent pay, although they are bothered some with water. The company's tunnel is in over 4,000 feet. Unfortunately they were about 30 feet too high, and are obliged to work through an incline. Water has increased so fast that the company has let a contract at \$125 per week to keep the mine free from water. Gravel and water are both raised by hand as yet, which renders the working exceptionally expensive. For the past month and more the gravel has paid in the neighborhood of six or seven dollars per carload. The North American company now has its tunnel clear through the ridge, and has found gravel that pays \$2.25 per load, which is good pay, considering that the mine is not an expensive one to work, as mines go.

EXTENSION.—The Extension company took out 78 ounces and 10 pennyweights of gold last week, the value of which was \$1,460.10. The company are working 18 breasters. More cars are being made as rapidly as possible. The company are now working three miles to haul their gravel, and the workmen to and from their work, a little over 4,000 feet. A connection by 12-inch pipe has been made with the Bald Mountain works at Lowell avenue, and by doors in the tunnel, the air is forced through the drifts and out by the way of the avenue. The workings have not yet crossed the channel, and nothing is known positively in regard to its width. The company have at present all the men they need, or will need for a long time, and it is useless for miners from abroad to apply for work at present, as it is the policy of the company to employ men resident in Sierra county in preference to outsiders. We notice that the company has a series of rules posted at the tunnel mouth. Among others is one to the effect that men getting intoxicated and failing to report for work at the proper time, may consider themselves discharged. Water to wash gravel will probably hold out for six weeks or two months longer, after which pumping will have to be resorted to or washing stopped.

Trinity.
ANOTHER RICH LEDGE.—*Trinity Journal*, June 2: Mr. J. W. Blakemore was in town last week and

left with us a specimen from a rich quartz ledge recently discovered by Uncle Jimmy Blakemore, and which lies just over the ridge from Eastman Gulch and on the Jennings Gulch side, being about one mile southwest of the rich ledge owned by Mr. C. Hickey. This is the eighth gold-bearing ledge which has been discovered by "Uncle Jim", but far exceeds in richness any that he has before found. The late discovery is well-defined and is from 18 to 24 inches in width, the rock being estimated to go from \$100 to \$300 to the ton in free gold. Rock is now being taken out and crushed in an arrastra in Eastman Gulch and we hope to hear of large results when a clean-up is made.

NEVADA.

Washoe District.

HALL AND NORRIS.—The new winze now being sunk on the 2600 level is now down 15 ft, and at the bottom ore assaying from \$20 to \$30 per ton. It is supposed that this is from a new streak, as it is not thought that the winze is deep enough to cut the Keating vein, which lies to the westward a few feet. Two or three new streaks of ore have been found to the west of the Keating vein in cutting out and enlarging the station. Night before last, at a point where they are enlarging for a car-track, they found a feeder some five inches wide, which shows fine ore. There are still feeders of ore coming in where work was discontinued at the west wall of the station, and the ground in that direction presents a very favorable appearance. Everything seems to indicate that they are on the top of what will prove to be a favorable deposit of ore. They have drifted on under the winze that starts on the 2400 level, and have opened a chamber for an upraise, but the upraise itself has not been started, as they are awaiting the co-operation of the Chollar folks in this work. Only about 80 ft remain to be excavated to make this connection. It will be of immense value as it will give thorough natural ventilation to a large amount of ground which is now very hot. The ore brought up out of the new streaks yesterday shows well in sulphurets and chlorides.

SIERRA NEVADA.—On the 2900 level the joint Union Con. winze is down about 88 ft, and is in a favorable formation of vein material.

BEE AND BELCHER.—The northwest drift on the 2500 level is advanced in ground that is hard and dry. The diamond drill shows that this character of ground will continue for a considerable distance. It has been long since there has been any crosscutting in this mine. They will soon be in a position to make extensive explorations.

YELLOW JACKET.—This mine is yielding well at nearly all points. Quite a bonanza of low-grade ore has been found in new ground on what the miners term the "Frog Pond Level." This is really quite a valuable discovery.

OPHIR.—A considerable quantity of ore is still being extracted from the croppings, and this work will be much facilitated by the opening out of the old tunnel.

POTOMAC.—Although active prospecting is not in progress in this mine at present, the developments in the adjoining mines show that they have a valuable streak of ground to the west.

CON. VIRGINIA.—On the 2700 level the drain is completed. The west drift on the 2700 level is making good progress in very favorable vein material.

Rebel Creek District.

THE OHIO MINE.—*Silver State*, June 1: Joseph McColley, one of the owners of the Ohio mine in Rebel Creek district, informs us that work is being prosecuted steadily on the mine, which continues to look remarkably well and produce rich ore. Some 12 or 15 tons of the ore will be brought here shortly for shipment.

Bullion District.

RICH ORE.—*Fresno Times-Review*, June 1: It is reported that large bodies of rich ore have been found in Bullion district, south of Beowawe, and across the mountain from Lewis.

Columbus District.

BROKE THE MAIN SHAFT.—*True Fissure*, June 2: The main shaft in mill No. 1, or upper mill, of the Northern Belle company, at Belleville, broke on Thursday night. This will necessitate the complete closing down of all the machinery in the mill until a new shaft can be received from San Francisco. The steam cylinder of the engine has needed repairs for sometime, and will be attended to during the two weeks' stoppage.

PUSHING THE WORK.—The new site of Columbus Con. hoisting works is one of activity. A large force of carpenters, masons and laborers are busy framing the building, putting in the engine and other foundations, and clearing the ground in the vicinity of the new shaft, which has already been sunk a distance of 60 ft. The new works will be the largest in the district, and will be ready in about three or four weeks. A description of the building and machinery will be given next week.

MOUNT DIABLO.—The stope from the lower winze No. 2 shows two feet of \$70 ore, and the stope above the third level, near the head of this winze has developed some 15 inches of \$85 quartz. The stope above the west drift from the Callison winze is looking well, the ledge averages fully two feet in width, the grade of the ore being about \$75 per ton. A small amount of ore of a good grade continues to be extracted from the first level and from the Mount Diablo adit. A shipment of bullion amounting to \$5,125.59 was made May 24th, and another of \$3,494.53 on the 28th ultimo.

Grantsville District.

QUIET.—*Grantsville Bonanza*, June 2: Everything is as silent as the tomb in the Alexander and Brooklyn mines. Active operations have not yet been commenced.

Lewis District.

RESUMING OPERATIONS.—*Fresno Times-Review*, June 2: Work is to be resumed on the Dahlgren mine, at Lewis. T. G. Morgan, Supt. of the mine, has returned from Arizona, where he had been examining mines for Eastern parties, and he goes direct to Lewis to make arrangements to commence work.

Mount Cory District.

REDUCTION WORKS.—*Bodie Free Press*, June 2: Warren Loose returned Friday from a trip to Mount Cory. He says that the Mount Cory Co. have graded out a place 100x300 ft for their reduction works, and that the contract for erecting them has

been awarded to Salkeld & Eckert. This is four miles from Hawthorne and several miles from Coryville. Money is scarce in the new camp, but hope is high.

Ophir Canyon District.

BULLION.—*Grantsville Bonanza*, June 2: The Twin R. M. Co., Ophir canyon, is shipping bullion steadily. It looks as if Ophir is on a fair way to become a flourishing camp once more.

Taylor District.

NO WORK.—*White Pine News*, June 2: Parties in from Taylor District inform us that there are close on to 300 men there—only about 40 of whom are working. Every large-sized sagebrush in the vicinity has a camp beneath it. Taylor is expected to boom this summer, but just now is no place to go hunting work.

Union District.

NOT PROSPECTED.—*Grantsville Bonanza*, June 2: Union mining district has never been prospected to any great extent and the discovery of new mines as valuable as any yet opened will not surprise any one acquainted with the district. James Liston, Jake Gooding, Steve Merton and W. Crowell are working their mine in Union district with the most encouraging results and they are taking out some very high grade ore.

Washington District.

REDUCTION WORKS.—*Grantsville Bonanza*, June 2: Reduction works will probably be erected for the purpose of converting ore from the Hon. A. J. Franklin's mines into bullion.

ARIZONA.

A REVIEW.—*Tombstone Epitaph*, June 2: In the varied experiences we have had of mining camps on the Pacific coast we can not call to mind one instance in which so various a display of ore can be shown up, or so general a mineral impregnated region exposed, as in the Tombstone mining district. In new mining regions developments are few and far between, but here week by week we have to record not only the development of ore bodies already known, but the existence of new leads, which so far have never been heard of in public, and in places that no mortal man would look for mineral bodies of ore, are found by hard work and indomitable courage. The inference, therefore, is, that as a mineral region Tombstone is unsurpassed in any State or Territory of the United States of America, and that as our mines are only in their infancy we have before us a future and such a future as none of those resident here can or will be ashamed of. Since our last report we can record new developments in the Alps, Ground Hog and Prompter, tending to confirm our statements; and from the appearance of each and all they are permanent developments, and as such will do much to keep the character of Cochise county mines before the eyes and recollection of capitalists. Within the next year, we predict not only a boom here, but the permanent investment of capital that will do us all good, and make the name of Tombstone (ludicrous though it is) at least as great historic fame as has ever been gained by the Comstock or Virginia City in its palmy days.

COLORADO.

A STRIKE IN LINCOLN TUNNEL.—*Georgetown Courier*, May 31: Dumont was somewhat excited Saturday, by a good vein of ore having been encountered in the Lincoln tunnel property of the Albion G. & S. M. Co., of Philadelphia. The long looked-for and anxiously expected California lode has been intersected. The vein exposed so far shows eight inches of solid ore, carrying yellow and gray copper. This mineral has all the characteristics of that found in the Albion mine. The facilities for extracting the ore cannot be excelled in the county. The crosscut tunnel, situated as it is near the base of the mountain obviates the necessity of a wagon road being built, as a chute is the most feasible. This tunnel is unquestionably the main avenue to all the properties located upon Albion mountain. The owners deserve all the profit that can be derived from what appears to be so splendid a bonanza. There untiring patience, perseverance and confidence is worthy the emulation of other companies in this vicinity. The Mansfield company should take this into consideration.

IDAHO.

ORE AND BULLION SHIPMENTS.—*Wood River Times*, May 26: Ore is rolling down from the Davitt, Jay Gould, Idaho Democrat and other mines to the sampling works here, thence to the Ketchum smelter, and back in base bullion bars for shipment to Omaha by rail. The shipments are becoming larger each week, and soon the bullion shipments will be the best evidence of the mineral resources of this section.

THE WARM SPRINGS DISTRICT.—The mines in the Warm Springs district are all showing well in depth. The mines are now down 50 ft, with a vertical shaft on the Island mine, in quartz and galena. The vertical shaft on the Night Hawk is sunk to the depth of 75 ft, with a well-defined vein and a 14-inch body of shipping ore at the bottom. The main shaft on the Black Hawk mine is down 280 ft, and each shift is sending up tubs full of galena which will sell at good figures on silver assay. There are 1,400 to 1,500 tons of ore out on the dump at the Irvine mine ready to be hauled to the Ketchum smelters, and more piling up daily. The Irvine and West Fork groups of mines are so productive at present that the Philadelphia Co. counts upon a sufficient supply from them to keep the smelting works running, and the manager expects that they will ship 6,000 tons, the present season. The East and West Forks, Elkhorn, Greenhorn, Trail, Eagle, Lake and Boulder creeks, with North Fork thrown in, are clear of snow on the south hillsides, and ready for mining operations. Numbers of men are camped at their respective claims, starting work for the season.

THE NEW SAMPLING WORKS.—*Wood River Times*, June 2: The new Hailey Sampling Works will be under the personal supervision of Mr. Moulton, one of the proprietors, who will endeavor to see justice done to both buyer and seller. The foreman will be W. W. Phillips, one of the best samplers on the west side of the Rocky mountains, who comes here from the Utah Sampling Mill, Salt Lake, where he has had several years' experience; and the book-

keeper will be C. P. Tatro, who resigned the Postmastership of Bellevue to take charge of the books. In addition to the above staff, some 25 to 40 men will be employed.

MONTANA.

BUTTE MINES.—*Inter-Mountain*, May 26: On the 200-ft east drift of the Magna Carta a south crosscut lately extended to intersect the south vein, has opened two ft of ore which yesterday sampled \$75.77. The Paser shows up a magnificent ore body in the crosscut from the bottom of the east shaft. For a solid width of 18 ft the ore samples 35 ounces, but an eight ft breast is being extracted which assays between 40 and 75 ounces. O'Donnel brothers who have a lease and a \$50,000 bond on the Sun Burg are making arrangements to erect a steam hoist on the property. In the Mice, on the 100 and 200 ft south levels, the extraction of about 20 tons of ore daily, continues. The 300-ft north crosscut of the Bell has been started from the new three-compartment shaft but the work does not interfere with the sinking which will be continued to the 400-ft station. The Lexington mine and mill are running smoothly and the production of \$50 and \$60 ore remains at about 60 tons daily. The output this month promises to exceed \$95,000. The Colusa is producing between 75 to 100 tons of ore daily, according to the requirements of the smelter. The Moulton keeps on the even tenor of its way and under the charge of Mr. Pat Clark, one of the best practical miners in Montana, is making a very satisfactory record. The upper levels of the mine show an abundance of ore which is so accessible that the working force has been considerably reduced and the output is still in excess of the capacity of the mill.

NEW MEXICO.

COAL CROPPINGS.—*Las Vegas Gazette*, May 22: At last it seems to be an established fact that Las Vegas is to be supplied with coal from its own vicinity. Much excitement was caused yesterday by the news that a fine three-foot vein of true carbon had been discovered by some workmen engaged in excavating for a culvert on the bank of the Gallinas just in the rear of the Montezuma hotel at the hot springs. The coal, which lies near the surface in a locality where it can easily be worked, is pronounced by experts to be of a very superior quality—and while the extent of the deposit cannot be estimated as yet, it is reasonable to suppose from the formation, that the supply will be immense. Another fine cropping of very superior coal has been discovered by a miner named Howard, at Mineral Hill, 15 miles from this city. A couple of sacks of the product have been brought into town and are now on exhibition at N. L. Rosenthal's store. Howard will put on men to develop this showing at once, in order to claim the bonus of \$500 offered by the board of trade to the first person who shall produce a good mine of the precious fuel within reasonable hauling distance of Las Vegas.

VICTORIA MINING CAMP.—*Southwest Sentinel*, May 26: This camp is a very promising one. It is situated in the southern portion of Grant county, about three and one-half miles south of the S. P. railroad, and in a direct line from Gage station. But very little has been said about this district, for the reason that very heavy capitalists are interested, and as they do not desire to sell but anxious to buy more, it is not to be expected that much information can be gleaned from them. However, having been on the ground ourselves we know something about the camp. Messrs. Hearst & Head own five claims in the district and have about 30 men at work on the Last Chance mine. This is an excellent piece of property and is so regarded by the owners, who understand mining operations as well as anyone in New Mexico. The formation is limestone and the ore is found in "pockets" or chambers. Often some very large bodies are found in some of the ore deposits. They are down 250 ft with their deepest shaft and have extracted a great quantity of mineral. It runs on an average 32 ounces in silver, \$12 in gold and 35 lead. The camp contains about 30 men. The But Cut is another good claim. Mr. Callahan, who is the superintendent and represents a N. Y. Co., has 400 ft of work done on it, and is opening it up rapidly. He and Hearst & Head are shipping their ores to Benson, A. T., where there are good smelting works. They ship on an average 150 tons per day, and are realizing handsome profits in the transaction. George E. Price has nine claims in this camp, all of which are looking well. The Jefferson mine, owned by Charles Fuller and John Grondhouse is an excellent piece of property. The owners have now on the dump about 100 tons of heavy lead ore. The Arizona, owned by a St. Louis Co., is looking splendid.

FLEMING DISTRICT STRIKE.—*Las Vegas Gazette*, June 2: Native silver was struck in Old Man mine, Camp Penrose, the other day, and 30 tons of high-grade ore has been shipped. The real wealth of the new camp is only beginning to be known. Great excitement prevails over the late strikes, and everything is at high pressure. Capitalists are arriving daily, seeking investments in the new bonanzas. Property is changing hands at enormous figures, and the prospects are almost certain for still further advance. Thousands of people are flocking into the new camp, many hotels and stores are going up, and everything is booming.

UTAH.

A BIG MINING STRIKE.—*Salt Lake Tribune*, June 2: There was a rumor in this city last week of a big strike in Big Cottonwood, but it could not be traced to authentic source, and but little was said about it till yesterday, when parties who visited the mine confirmed the previous report. The strike was in the property of the Silver Mountain M. Co., which is situated on Kessler's Peak, Big Cottonwood. For some time past a tunnel has been run to cut the vein, and this was accomplished last week when the tunnel had penetrated the mountain 400 ft. An ore body five ft wide, the first-class assaying 55 ounces silver, 58 lead, 33 gold, the second class 23 1/2 ounces silver, 26 lead, was encountered. The tunnel is 400 ft below the upper workings, and all the ore can be extracted through it. The strike is the most extensive that has occurred in Big Cottonwood in several years, and will do much toward causing others to develop their properties. Ore shipments will begin as soon as the roads are put in condition, and Silver Mountain will add its wealth to the prosperous Territory.

The Cedar of the Gods.

[Written by Mrs. JEANNE C. CARR.]

An unexpected but most welcome rain has left all our young conifers in their Sunday's best, and so beautiful are they that I would fain add my weak voice to the chorons of rejoicing and praise outpoured by a thousand feathered songsters this May morning.

Of many delightful trees the accompanying faithful portrait will give a very correct idea of the typical form of the Himalayan or Indian cedar in youth. Our specimen, fifteen feet high, was purchased of W. B. West, of Stockton, in 1878, and brought here in a four inch crotch, with a small specimen of the Cedar of Lebanon, both in my lunch basket.

Each are now developing their distinct characters, and looking upon the exquisite drooping grace of the one, and the sturdy horizontal arms of the other, I send my thoughts afar to the scenes where these noble representatives of forest grandeur are native.

The Deodar forms vast forests in the Himalaya mountains, where the eminent botanist Sir Joseph Hooker studied it, and recorded his observations in the "Himalayan Journals" more than twenty years ago. The brothers Schlagintweit were among the earliest botanists of these elevated regions, and I shall never forget meeting one of them at an inn in Mariposa, in the summer of 1869, he returning from, and I going to worship in the Big Tree Groves. His comparison of the Asiatic and American Cordilleras was most interesting and instructive. The people who live in the chalets among Deodar are brave and patriotic like the Swiss; and passionately attached to their mountain homes. They are often fair haired, and of a lighter complexion than the inhabitants of the plains. In times of which chronology has no measure, the ancestors of these hill people worshipped trees, and built vast temples in the plains below; it does not appear that the Buddhists now specially reverence any vegetable except the banyan.

The uses of the Deodar are manifold; it serves every purpose of our large family of firs and pines.

Remembering that the Deodar on its native heath enjoys a rainfall of 120 inches, I am surprised to see how well it has accommodated itself to a climate with less than twelve inches. The next ten years will be of much more importance in demonstrating whether these trees can be truly acclimated here, than the past five have been, for we tend our young conifers like so many babies. Shading them when necessary, and mulching them abundantly. All the shavings from our new house have been carefully saved for this purpose.

In close proximity with the Deodar stands my Cedar of Lebanon, very different in color, this being a rich grass-green, while the Deodar is silvery; should they live fifty years, their heads will touch each other. And this tree, too, was studied by the botanists just mentioned, not only on Lebanon, where a few specimens remain of the great forest which Hiram, King of Tyre, cut down to oblige King Solomon, but also in the Taurus mountains, where there are virginal forests still preserved, because there is yet no means of transporting the precious timber when it may serve the builder's uses. The oldest specimen of the Cedar of Lebanon in Europe is in the Jardin de Plantes, in Paris, where it was planted by De Candolle, who brought it from Palestine more than a century ago. It is related that the vessel in which he crossed the Mediterranean was unseaworthy, and in the prolonged voyage the sailors and passengers suffered greatly for water, but De Candolle resolutely denied himself, and gave his scanty portion to the little tree, which, thus saved from perishing, has become his monument. The oldest Cedar of Lebanon in the United States is in the Bactran Gardens, in Philadelphia. This was raised from a seed.

During his visit to this coast in 1879, I was surprised to hear Dr. Hooker say that he considered the Cedar of Lebanon and the Deodar specifically identical, the change of habitat accounting for the difference in their appearance and mode of growth. I rather resisted this view, having had no opportunity to compare the cones, but the better I become acquainted with them, the more I become of his opinion. Then the way that our Pacific coast conifers are behaving under cultivation in England, unsettles ones cherished ideas about permanence of characteristics. Now, *Thuja gigantea* is here a massive tree of compact form, usually a dense pyramid of living green; but a variety sold in England as *Thuja Lobbi* is described as looking like "a delicate fishing rod laden with the most exquisite fronds of ferns, each standing quite clear of its fellows, by reason of the rapid growth of the central shoot."

The above description is not too florid for our beautiful Deodar. And right here let me say a word about pruning these trees. I was inexpressibly shocked last October, on a brief visit to Sacramento, to find the pride of the Capital park, John Ellis' splendid row of Deodars, hopelessly maimed and skeletonized by the shears. Ten years' growth can hardly repair the damage to their beauty. If let alone severely for that length of time, the side branches will grow out, droop downward and hide the disgrace of their naked trunks.

It is permissible to touch the Deodar with a knife when a riotous growth causes it to send up two or more leaders. Even then it is better

to wind a scrap of fine wire around all except the finest and strongest, thus forcing the sap to it; after a few weeks the ligatured branches will fall off, leaving no scar. And if it is ever necessary to prune the side branches, the cut should be made at least half an inch from the stem, and the cut painted or smeared with clay. The stub will recloth itself, and prevent diseases of the bark from exposure to sun and wind.

Deodars may be grown successfully from cuttings; they never make quite as handsome trees, but will serve an excellent purpose as screens. And there is no reason why a single Deodar should not adorn a town lot, for half a dozen years, even if want of space should require its removal afterwards. Very small conifers, weeping cypresses (not Monterey), and golden arbutus can be used with good effect in miniature grounds. The common American hemlock which grows slowly in California is one of the best for this purpose.

But I have wandered too far from my subject and purpose, which was to promote the culture of these lovely trees. In another paper I will gossip concerning the Anricaria family. Pasadena, May 6, 1883.

QUICKSILVER DISSOLVES GOLD.—Thos. K. Beecher, while investigating the mines at this place, decided a question which has long perplexed the practical miner—that is, that quicksilver will dissolve gold. Miners have always understood that nothing but "*agua regia*" would dissolve gold, yet they have known that mercury, after being used in saving gold, retained



THE DEODAR OF THE HIMALAYAS. (*Cedrus deodara*.)

a portion that was impossible to separate but by retorting. They called quicksilver in this condition "charged," but supposed the gold was merely held in suspension. Mr. Beecher, being a thorough chemist, described the test he had made, which left no doubt that mercury will dissolve gold to the extent that miners understand by the term "charged." This fact being understood, it is evident that mercury used in a flume, though the "clean-up" may be small, yet the mercury will contain, in solution, as much gold as if it had amalgamated a greater amount of gold. Therefore, miners should retort their quicksilver after every "clean-up" to save the loss of the gold which necessarily wastes with the waste of quicksilver, that this scientific discovery places beyond a peradventure.—*Placer Times*.

In the middle ages, the production and use of copper would seem to have been, in a great measure, abandoned, probably because of the discovery of the more precious metals with which it was found associated. At least the records of that period in the world's history contains little concerning the working or use of the metal.

In the year 1844, the Lake Superior copper mines were discovered, and these have since proved to be the richest and most productive mines of copper in the world. Abundant evidence of the previous working of these mines were found in the rude stone tools and primitive appliances for reducing the ore which had been left by an unknown people, who had, in ages past, inhabited this continent, and whose history is unwritten.

Wood River.

Many new comers express surprise that there is not a greater number of people in town, and that the streets are not crowded with men. Of course citizens of Hailey feel a natural interest in seeing strangers favorably impressed with this section upon their arrival; but such observations as, "The town looks quiet, and few people are to be seen," evince a superficial perception on the part of those who express them.

Last year there were computed to be 10,000 miners, prospectors and residents of all callings in the Wood River country. Of that number the towns contained not over 3,000. This season so far, with the arrivals in Wood River averaging 40 daily, the towns are not increasing much in population, and this fact is the best evidence that the country is growing as it should—for permanence. Out of 1,000 arrivals this spring in Hailey, not 200 have remained in town. Every day—especially early in the morning—parties on horseback leading pack animals loaded with tools and mine supplies may be seen starting out in every direction for the hills, to prospect or work mines already located. Not less than 100 men have gone from town the present week, and every man who leaves for the mines becomes a producer of wealth, and each town eventually receives a proportion of the product of his labor.

The present season there will be 20,000 miners and prospectors in the Wood River country, while probably the population of the towns will not be increased more than half. To any prac-

Snake River Placers.

A New Method for Working the Fine Gold.

It really looks as though the method of saving the fine gold in Snake River valley has been found. The credit is due to a company of working miners, men who have followed mining all their lives. The idea seems to have been borrowed—at least in part, from the manner in which tin is saved in Cornwall. The best of it is that no ponderous and expensive machinery is required. The method is simplicity itself, and any jack-carpenter can make a machine in a couple of days. A machine requires one man to run it, and from the first 40 hours' run \$89.50 in gold was retorted.

It is not claimed that all the gold was saved, but it is unquestionably true that more is saved than by any other method hitherto tried. These men bought twelve planks in Ogden, paid \$1 a plank freight to get them to Eagle Rock over the Utah & Northern, and in a few days went to taking out gold. Some rough lumber they bought here, but there is not probably exceeding 300 feet in the entire machine. It is no longer a question of faith, and this company of miners have already commenced to multiply their machines, with the same certainty of being engaged in a legitimate business that will pay them from \$7 to \$10 per day to the man, that a farm hand in Missouri has when he works for \$15 a month.

And now, to give our readers some crude idea of how the gold is saved. A sluice box with a false bottom is constructed; the false bottom is of perforated sheet-iron. The gold and black sand drops through these holes on to the second bottom, while the coarser stuff is carried out and dumped into the river. Some twenty feet from the river, the sand and gold drop through a slit in the main sluice into a second sluice box, just under and crossing it at right angles, or like the top of a letter T. This last box has a number of smaller sluice boxes, reaching from it toward the river, and casting the water and lighter sand into it. The whole is something in the shape of a stable fork, the handle being the main box, the cross-piece being the second or lower sluice box, and the tenth representing the final boxes, after passing through which the water is allowed to waste. The bottoms of these last boxes are padded with burlap, which is removable at pleasure. In the burlap is where the gold is found, and about once in every twenty-four hours the burlaps are wrung out into a tub and the gold is retorted. There are some devices adding to the perfection of the machine which are not necessary to mention, as an effort so to do would result in confusing the reader. It is enough to know that each machine is good to save, say \$20 a day, and that two men are sufficient to run it twenty-four hours—or one man on duty at a time.

Water, of course, is a side question—but there is plenty of water. In high water Snake river can be brought into use. There we have North Willow creek, South Willow creek and Sand creek. When all these get low, the Snake River Water Co. can supply any amount of water through their canal and put it anywhere.

It is hard to say what the result of saving this gold is to be. There are a million acres of land, and you can find the color anywhere. D. F. Chamberlain showed me a pan he had just washed out below town, and there were a thousand colors in it. Only yesterday the writer picked up a pebble fully a mile from the river on an open prairie, and few gold colors discernible in it to the naked eye. If that pebble had remained, in a few hundred years it would have dissolved and added its little specks to the other specks that have been released from similar stones, and one more color would have been found by the man who shall wash a pan of dirt from that spot a thousand years hence.—*Cor. Salt Lake Tribune*.

Leaching Works.

It will be remembered that some time ago Albert Arentz visited Eureka, bringing with him 15 tons of ore from the Mt. Cory mine, near Hawthorne, to test the reduction of it in the Geddes & Bertrand mill by the leaching process. He went away delighted with the working of this plan and reported the same to the Mt. Cory Company, who accepted his suggestion to adopt the leaching process for their ores, and have appointed him to superintend extensive new works about to be constructed at Coryville. These works are thus described by the Walker Lake *Bulletin*: The main building will be 300x140 feet, and the entire works when completed will cost about \$150,000. They will doubtless be the best on the coast, as every useful improvement in machinery and process will be adopted. The works will consist of a mill and improved Brockner furnace, capable of working from 60 to 70 tons daily. It is not to be a stamp mill, but a leaching mill with revolving furnaces. Krom rolls, somewhat similar to Cornish rolls in appearance, but of greatly improved construction and manner of working will be used. The ore will first be broken in rock breakers, from which it will pass to an improved form of dryer. After drying it will be put through the rolls, where it can be crushed to any fineness required. After crushing the pulp will be put through the chlorinizing furnaces, of which there are four, and from the furnaces will be taken to the leaching vats, which are operated by an improved method. The silver is precipitated in the vats and is then melted into bars.—*Eureka Sentinel*.

MINERS—and by this term we mean men who own mines and work them—are not at all pleased with the law which allows a man to locate any number of claims and hold them by trickery. One operative miner yesterday told us that in his immediate neighborhood a certain man claims, for himself and others, perhaps forty claims, some of which are good and would be worked if they could only be located by working miners. The claim-owner in question holds his ground as long as the law will let him. His plan is, not to do assessment work, but to watch and wait until time is up, when he relocates and holds them for another period. This kind of performance should not be encouraged. Mines can never be developed in this way, so that it is not strange that working miners desire a change in the law.—*Prescott Courier*.

A Bright Outlook at Safford District.

Never in the history of Safford district did its mines look better than they do to-day. News lately received from that section pictures the scene as bright and encouraging. The Onondaga, the mammoth mine of the camp, under the able management of Col. Tyson, has been stripped on the surface along the ledge a distance of 800 feet, exposing ore varying in width from eight inches to six feet, and in price from \$30 to \$450 per ton. A force of 20 men is employed at present, and more are to be put on as soon as necessary tools arrive from Salt Lake City. A new tunnel has been started about 25 feet below the old workings, which is to be run a distance of 800 feet, there to connect with a shaft which is being sunk on ore on the northern end of the claim. The outlook on the surface is more than encouraging, and should the ore continue down, the wealth of this mine would be fabulous. Fully 800 sacks of ore are awaiting shipment to Salt Lake, and a large quantity is lying loose on the various dumps preparatory to sorting and sacking.

The Zanolli

This claim is really at present the only well developed one in the district, and shows a considerable amount of work. The ledge was first encountered in the shaft at a depth of 30 feet, and has since continued down a distance of 112 feet, varying in width from three inches to six feet, the latter being the present width of the ledge at the bottom of the shaft. The ledge is perfect and well defined, the foot and hanging walls being plainly discernible throughout the entire depth of the shaft. The ore averages high, assays ranging from \$26 to \$300 per ton. Fully 125 tons are already on the dump, and a careful estimate of the ore in sight in the mine, places the value at \$40,000. The owners of this property deserve encouragement, as they persistently toiled and labored in pushing a tunnel a distance of 300 feet without success, finally going to a place above, where, at a depth of 300 feet, the ledge was encountered. If present indications continue, it is the intention of the owners to erect a mill on the Humboldt river, at Girard, about a mile distant, where it is estimated ores averaging \$12 per ton can be worked at profit.

The Other Mines

In the district we pass for the present, as sufficient developments have not been made to ascertain the extent of the ledges. Assessment work is being done on most of them, and it is calculated that by the 1st of June, fully 100 men will be at work in the district. The country abounds in ledges, and the appearance of the Onondaga and Zanolli should encourage owners in the vicinity to commence operations immediately upon their properties.

The Country

Is all that could be desired. Wood and water are abundant, Safford canyon being a net-work of springs and water courses. The Humboldt river is distant but a mile and a half from the mines, where ample water power can be procured for mill purposes. A little settlement has been established at Gerald station, where the C. P. trains stop for passengers coming and going to the mines. At Safford a number of comfortable dwellings have been erected, where hereafter man and beast may be accommodated. Several buildings are shortly to be removed thither from Palisade, and the 1st of July will see a thriving little village in the northern end of the county.

"The Sleeping Village,"

As Palisade has been termed by some, will receive untold benefits should the future of Safford prove as now anticipated. Commerce and travel must necessarily center at that place, and already the little town is beginning to feel the effect of operations at Safford. Baum, the genial proprietor of the Depot hotel, is renovating and otherwise improving its popular hostelry, preparatory to the anticipated rush. The Palisade hotel has fallen into the hands of D. T. Jones and wife, a deserving couple, and is being conducted in a first-class manner, and though it is situated a little out of the line of travel, they will undoubtedly get their share of patronage. Syl. Bunta, an old Tuscaroran, has leased the Hogle corner, and is apparently doing a good business. Tom Jewell, S. S. Carney, "Curley" and all other old standbys are still wrestling with Dame Fortune, and appear to be perfectly contented in placidly waiting the coming boom. The E. & P. Railroad shops are in full blast, the climate is lovely, the people are happy over the bright prospects, and it is more than probable that ere many months roll around another promising camp will be added to the taxable property of Eureka county.—*Eureka Sentinel*.

NEXT to iron, copper is the most useful metal in the world. In its general distribution, it comes next to that most important of all metals. The qualities of durability, malleability; ductility, etc., it possesses render it adapted to a great variety of purposes.

THE general work at Tombstone progresses steadily and energetically. Those mines which have not reached water level are doing their utmost to reach that point, as it is a foregone conclusion that the developments beneath this level are likely to be productive of better ore than what has been found above.

USEFUL INFORMATION.

The Manufacture of Watches.

Few persons estimate the amount of work in a watch of modern manufacture. Nearly a thousand processes are used in completing them. There are fifteen distinctly different kinds, and as many as 150 varieties of finish, number of jewels, construction of balances, etc., independent of cases and their varieties. Women are largely employed in the work of watch-making, especially in Switzerland. But since the year 1850, the whole process has undergone immense change by the substitution of machinery for hand work, which originated with Mr. Dennison and Edward Howard, of Boston, who established the first manufactory of watches at Roxbury, Mass., when it was moved, in 1854, to Waltham, on the Charles river. Each separate portion of the watch is made on a machine specially constructed for the purpose, and the gauges employed are so accurate that 1-1700 part of an inch can be measured. Some of the portions used in watch making are so minute that it takes 150,000 of them to weigh a pound.

WATER GLASS IN PAINT. Water glass is now being made use of in the production of a paint which, in addition to its beauty and durability, is also advantageous as a means of protection against the action of fire. As a floor paint it is found especially valuable. The surface having been well cleaned, any crevice, or cracks between the boards are next luted with a thick mixture of water glass and pulverized chalk or gypsum, then, by means of a stiff brush, a coating of water glass, of syrup-like consistency, is spread over the floor, and to this succeeds a second coating of the same, mixed with a desired color—the latter a mineral color, as the alkalis of the water glass commonly decompose vegetable colors. This coating having become dry, other layers of the water glass are given, until the floor acquires a fine lustrous appearance. In order to insure a polished brightness, the surface is ground off a little, oiled, and thoroughly dried. The water glass is not worn away either by heat or by continued use.

MELTING IRON WITH COPPER.—In the new alloy of copper, iron and zinc, considerable difficulty has been experienced in securing a uniform admixture of the iron. A London experimenter is said to have overcome this by his method of introducing the iron into the mixture of zinc and copper. When ordinary wrought iron is introduced into molten zinc, the latter readily dissolves or absorbs the former. The exact point of saturation, or the proportion dissolved or absorbed, varies with the temperature at which the molten zinc is maintained during the process, and it is by carefully ascertaining and controlling this temperature that a perfectly uniform product has been obtained. The metal thus produced, and to which the name of delta metal has been given, is stated to be as much superior to brass as phosphor-bronze is to gun metal, or as steel is to iron. It possesses great strength and toughness, and samples cast in sand give a breaking strain of twenty-two tons per square inch.

FENCE POSTS THAT WILL LAST.—A writer in an exchange says: "I discovered many years ago that wood could be made to last longer than iron in the ground, but thought the process so simple that it was not well to make a stir about it. I would as soon have poplar, basswood, or ash as any other kind of timber for fence posts. I have taken out basswood posts after having been set seven years that were as sound when taken out as when first put in the ground. Time and weather seemed to have no effect on them. The posts can be prepared for less than two cents apiece. This is the recipe: Take boiled linseed oil and stir in pulverized coal to the consistency of paint. Put a coat of this over the timber, and there is not a man that will live to see it rot."

A NEW INVISIBLE INK.—C. Widemann communicates a new method of making an invisible ink to *Die Natur*. To make the writing or the drawing appear which has been made upon paper with the ink, it is sufficient to dip it into water. On drying, the traces disappear again, and reappear by each succeeding immersion. The ink is made by intimately mixing linseed oil, one part; water of ammonia, twenty parts; water, 100 parts. The mixture must be agitated each time before the pen is dipped into it, as a little oil may separate and float on top, which would leave an oily stain upon the paper.

HEMLOCK TIMBER.—The timber of the hemlock tree is rejected by the builders, and yet it might have its important uses. "The stone which the builders rejected, the same became the head of the corner," seems to apply to hemlock for granaries. It is claimed for it that it will keep rats out, as they will not gnaw it in consequence of the sharp slivers penetrating their jaws, and they lose all relish for the grain beyond. This hint should be taken advantage of.

NEEDLES AND PINS.—One of the flourishing industries of Germany is that of the manufacture of needles and pins. The eight manufactories of Isenlohn alone consumed in 1882 no less than 600 tons of wire, employing 800 male and 700 female and juvenile work-people, besides seven steam engines and four water wheels of 230 horse power. A large export trade is thus maintained.

FRONIZING.—How to make woods, such as cherry, mahogany, etc., look like ebony, is often desirable, and a correspondent of the *Hub* gives the following directions: To imitate black ebony, first wet the wood with a solution of logwood and coppers, boiled together and laid on hot. For this purpose two ounces of logwood chips, with one and a half ounces of coppers, to a quart of water, will be required. When the work has become dry, wet the surface again with a mixture of vinegar and steel filings. This mixture may be made by dissolving two ounces of steel filings in half a pint of vinegar. When the work has become dry again, sandpaper down until quite smooth; then oil and fill with powder drop black mixed in the filler. Work to be chromized should be smooth and free from holes etc. The work may receive a light coat of quick-drying varnish, and then be rubbed with finely pulverized pumice stone and linseed oil until very smooth.

LUMINOUS PAINT IN RAILWAY CARRIAGES.—Luminous paint appears to be steadily working its way into practical use. A railway carriage painted inside with the Balmalm phosphorescent paint is included in one of the trains between London and Rotherhithe via the Thames tunnel. Although only one-half of the available space of the carriage is painted, the phosphorescent light is quite sufficient to enable the passengers to distinguish small objects when passing through the tunnel; and, moreover, the light is powerful enough to enable the indication of an ordinary watch. It is probable that the railway companies will be enabled to effect a considerable saving of gas and oil by using the phosphorescent paint.

TO CLEAN A WATCH.—Place a watch, with the case open and the works in motion, in a vessel so that the watch will be entirely covered with benzine. After three hours it will be found that the watch has been thoroughly cleaned. The vessel should be covered with parchment paper, and the watch, before it is removed, should be slightly agitated. Lastly, the watch is laid in benzine again, but this time a little petroleum oil is added, in order to lubricate the machinery.

TO POLISH STEEL.—Mix half a pound of fine emery powder with the same quantity of soft soap, and add a small piece of soda. Simmer this over a slow fire for two hours, to extract all the moisture. Rub on with a flannel, and finish with plenty of dry whiting.

GOOD HEALTH.

Sleeplessness.

A physician, writing in the *Christian Union* on this subject, remarks:

The causes that produce this serious trouble are various. Not unfrequently the tendency to it is inherited with a delicate nervous organization, and overwork will increase it. It is difficult for the sufferer to know just how much work, mental and physical, may be accomplished without producing the unpleasant result. For one so constituted a most watchful care becomes important, and the most interesting employment must be turned away from at the first sense of weariness.

An earnest conversation with a friend exciting your sympathy, the demand upon your strength made by an invalid, reading an article that stimulates the mind to intense thinking, may, any of them, cause you to spend weary, wakeful hours and lead to severe exhaustion on the morrow.

By watchfulness you may learn to spare yourself the over-fatigue, as a duty which others may not understand the reason for. You may avoid the conversation and the book at evening, seeking them at an earlier hour when the choice lies with you. But with every care you are liable to suffer from causes you can neither foresee nor prevent.

Sometimes indigestion will awaken you at the small hours, and take revenge for some very slight departure from the careful diet you uniformly adopt. Recently it has been discovered that many persons lose hours of sleep because they are in need of nourishment; that the fast is too long that continues from supper time at six o'clock until six or eight o'clock the next morning.

Physicians who used to prescribe bromide of soda or potassium for sleeplessness now urge their patients to take beef-tea instead. The writer, after trying various prescriptions with little benefit, was at length so fortunate as to receive such advice. At first beef-tea was used with some light bread or biscuit broken in it, sipped from a spoon as warm as it could be taken. Afterwards milk, just scalded, not hoiled, was substituted, and to make it more easy of digestion, a teaspoonful of lime-water was added to half a tumbler full of milk. To facilitate matters, a pocket stove with an alcohol lamp, or an arrangement for the gas fixture, should be at hand. If neither beef-tea nor milk can be easily procured, hot water, with an infusion of hops or mint, may be substituted, or even hot water alone will quiet restlessness and induce sleep. A darkened room that the moonbeams cannot enter, a little fresh air from an open fireplace or window, are valuable assistants in making the sleep continuous.

When once the habit of wakefulness is broken up, the beef-tea or milk may be taken cold,

but not iced. If you are always a poor sleeper, it will be well to continue this late supper as a permanent thing in your daily life.

Provide for it in the case of aged and delicate persons who may be under your roof; and, as the troubles of life appear most weighty when scanned in the midnight hours, you may be able to lighten the load for the rest of their journey.

Practical Hints about Glasses.

Persons finding their eyes becoming dry and itching on reading, as well as those who find it necessary to place an object nearer than fourteen inches from their face to read, need spectacles.

Persons under forty years of age should not wear glasses until the accommodating power of the eye has been suspended and the exact state of refraction determined by a competent ophthalmic surgeon.

The spectacle glasses sold by peddlers and by jewelers generally, are hurtful to the eyes of those who read much, as the lenses are made of inferior sheet glass and are not systematically ground.

No matter how perfectly the lenses may be made, unless they are mounted in a suitable frame and properly placed before the eye, discomfort will arise from their prolonged use.

There are three systems of grading spectacle lenses: the English, the metric, and the Prussian. Those made to supply the demands of the trade in this country are carelessly made, and are poor imitations of either the English or metrical system. The metrical scale has no equivalent, is not graded by any uniform rule of dividing the inter-focal spaces, and is therefore unsuited to the exacting demands of science.

The near sighted eye is an unsound eye, and should be fully corrected with a glass, notwithstanding the fact it may need no aid for reading.

The proper time to begin wearing glasses is just as soon as the eyes tire on being subjected to prolonged use.—*Medical Herald*.

PNEUMONIA.—One reason why pneumonia is so fatal in the spring is doubtless that people are not aware that the danger of contracting it does not pass off with the period of winter minimum temperatures. On the contrary, as an eminent medical authority has shown, "the latter part of the winter and the spring (during February and until June) is the season of pneumonia," especially of the disease in its complicated forms, with continued fever. The very dry polar waves may sap the strength of the body and make it a prey to insidious pulmonary disease. But they would be powerless to do this without the aid of the intervening spells of mild, moist, vernal weather, during which the alimentation of the body is light and the heavy winter clothing exchanged for stylish spring garments. In this latitude, when April arrives it finds all delicate, anemic and hard working people with a minimum of vitality and disease-resisting powers. The true preventive measures against pneumonia and the prevailing diseases of this inclement season are, therefore, a rigid adherence to winter dress and a generous diet for the next three or four weeks, with as much rest and recreation as possible.—*New York Herald*.

WARM BED CLOTHING FOR CHILDREN.—It is fully as important that children should be warmly clad at night as during the day. Nor is it sufficient that the bed-clothing should be warm. Indeed, we are apt to err in using too many blankets rather than too few. Then the restless child kicks off the cover, and from a warm perspiration becomes chilled through, and a severe cold is the consequence. Delicate children should sleep in flannel, while for more robust constitutions Canton flannel in the lighter grades is heavy enough. Night-drawers are to be preferred to night-gowns, and the legs of the drawers should be long enough to reach the feet. Indeed, the style which covers the foot also, like a stocking, is an excellent one for children who are restless sleepers. Night-gowns for babies should be long enough to come down well over the feet, and flannels should be worn in cold weather, the pinning blankets which are furnished with all layettes. In every household where there is a baby, there should be at least one open fire where its feet may be occasionally toasted. No one can sleep healthily when cold, and the baby will rest much better if laid to sleep upon a warm blanket than between cold sheets.

HOUSEHOLD DIRT.—The dirt which may be wiped from the walls, swept off the furniture, and beaten out of the carpets of any ordinary house, would be sufficient, if it were sprinkled in the form of dust over the patients in the surgical wards of a great hospital, to bring all their wounds into a condition that would jeopardize life. It cannot be supposed that such dirt is innocuous when it is breathed or swallowed, and it certainly possesses the property of absorbing and retaining for long periods, the contagious matter given off by diseases. Instances without number are on record in which the poison of scarlet fever, long dormant in a dirty house, has been roused into inactivity by imperfect attempts at cleaning. The preservation of health is not a mere mechanical question of the perfection of any certain matters, but depends upon the intelligent avoidance of all the causes by which disease is liable to be disseminated.—*Decorators and Furnishers*.



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SAN FRANCISCO:

Saturday Morning, June 9, 1883.

TABLE OF CONTENTS.

EDITORIALS.—New Pumping Apparatus for Mines, 385. Passing Events; Electric Pumping in Mines; Mines in Town Sites; Fresno Mines; New Water Jacket Furnace; Rapid Tunnel Work, 392. Improved Amalgamator and Settling Tank in Mines, No. 12; Academy of Sciences; D'Arce's Comet, 393. Patents and Inventions; Notices of Recent Patents, 396.

ILLUSTRATIONS.—Huffer's Mine Draining Apparatus; Pump Arranged for Well, 385. The Decad of the Himalayas (Cedrus deodora), 390. Methods of Framing Round Timbers, 393.

MECHANICAL PROGRESS.—Seasoning Wood; What is Galvanizing; Electricity; Wet and Dry Coal in Making Steam; Grinding Pig Iron by Grain; A Difficult Thing to Understand; New Zealand Ironsands, 387.

SCIENTIFIC PROGRESS.—Some Examples of Chemical Synthesis; Light from Gas; Separating Citric and Tartaric Acids; How to Brighten Carpets; Formation of Arsenides by Pressure; Formation of Chemical Compounds by Pressure; New and Stale Bread; Luminosity of the Magnetic Field; Cooking, 387.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends and Bullion Shipments, 388.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Idaho, Montana, New Mexico, Oregon and Utah, 388-9.

USEFUL INFORMATION.—The Manufacture of Watches; Water Glass in Paint; Melting Iron with Copper; Fence Posts that will Last; A New Invisible Ink; Hemlock Timber; Needles and Pins; Ebonizing; Luminous Paint in Railway Carriages; To Clean a Watch; To Polish Steel, 391.

GOOD HEALTH.—Sleeplessness; Practical Hints about Glasses; Pneumonia; Warm Bed Clothing for Children; Household Dirt, 391.

MISCELLANEOUS.—Mining Dividends; Smelting Ores; Thoughts on Prospecting; Gold, Silver, Copper; The Waterwheel Trials, 388. The Coterie of the Gods; Wood River; Snake River Placers; Leaching Works, 390. A Bright Outlook at Safford District, 391.

NEWS IN BRIEF—On page 396 and other pages.

BUSINESS ANNOUNCEMENTS.

Assessment Notice.—Seaton Gold Mining Co., S. F. Dividend Notice.—Standard Con. M. Co., S. F. Trinity School.—Rev. E. B. Spaulding, S. F. Engines.—J. M. Lakenan, Grass Valley, Cal. Mills Seminary.—Rev. C. T. Mills, Alameda Co., Cal.

Passing Events.

The exceedingly warm weather which has prevailed in this State, this week, is somewhat phenomenal. In San Francisco the thermometer ranged higher than it has since the Signal Service station was established here. It has been over 100 degrees in the shade. In many parts of the State the hot weather has been experienced for several days.

There is little now to report from the mining regions other than we have noticed in our usual summary. Both Montana and Idaho are just now attracting a large share of attention, and many new mines are being opened. The railroad connections now established with several of the prominent camps will give mining affairs a "boom" up there this summer.

No encouraging news has been received from the Lower California mines, and it is probable, as we predicted, that the placers there will amount to little owing to scarcity of water.

Who says that Calaveras placer mining is played out? There is a man living at Railroad Flat who "pans out" between \$5 and \$6 a day. There is lots of gold in our gravel beds yet, only it is not hunted for quite as extensively as in the earlier days.—*Calaveras Chronicle*.

THE Grantsville Bonanza advises miners in search of work to keep away from Grantsville till they are certain active operations have been commenced.

LARGE quantities of ores of all characters and grades are now shipped from the districts existing from Benton south for 150 miles.

Electric Pumping in Mines.

There has been a great deal of talk about the application of electricity as a motive power in mining operations, but few know that practical employment of the force has been made on working pumps in mines. This has been done however, at the Trafalgar colliery in the far famed Forest of Dean, where Mr. William B. Brain, one of the proprietors has applied electricity in a way to interest all mine owners. The generator and engine are on the pit bank. The machines are sufficiently portable to be carried about by a single individual, and, nevertheless, might be worked up to several horse-power. In connection with it are a couple of cables which are carried down the pit shaft. Suspended in one of the corners of the engine shed are two instruments—the "Ohm meter" and "Volt meter," answering to the steam gauge of the engine boiler. These show the amount of electric power being generated by the dynamo machine. Mr. Brain has adopted a simple device which indicates, approximately, the amount of electric power being generated without reference to meters at all. By introducing a couple of miniature incandescent lamps (Swan's or Edison's) and by looking at the amount of light they emit, the man in charge is able roughly to determine whether the electric force being generated is up to the requirements or otherwise, and he regulates the steam engine which drives the dynamo accordingly.

The electric pumps are in small chambers in the mine. The electric fluid is, as stated, brought from the surface to the pumps by cables, or stout insulated wires. The pump works thirty-two strokes per minute, and can throw a gallon stroke up a vertical height of ninety feet. It is pointed out that the electric pump was provided to meet a special difficulty, and here hinges an illustration of the great usefulness of the new power. There was only a small quantity of water at this point of the working, but in order to prevent its descending through the measures into lower parts of the colliery the electric pump was introduced, and, as already proved, with very great success. Small as it may be admitted is the actual utility of the pump in a colliery such as this, where large bodies of water have to be dealt with, nevertheless, from a mining point of view, it represents thousands of pounds. At Trafalgar, as in hundreds of other collieries, there are identical circumstances, where at various points water has to be either caught or allowed to proceed down the workings to other points. By contrivances such as the present one, the difficulty is economically and readily compassed, as the machine, when once started, continues without attention, except occasional oiling two or three times a day. In the present instance, the engine on the bank is sufficiently powerful to work a dozen such machines as the one described, and Mr. Brain is making arrangements to replace other pumps at various stations in the colliery, with electric pumps, and the firm will thus get rid of a heavy detail of cost in the working expenditure. As compared with the old system, the saving in wear and tear is considerable. At 1,000 yards from the shaft is a donkey engine and boilers and pumps; these will be shortly superseded by one of the new machines.

This mine has gaslights all through its galleries. Telephones from the manager's office connect with instruments at the pumps and various stations, so if anything goes wrong it is instantly noted. The manager has also at the pump stations electric lights, which are kept burning by the same current which runs the pumps. The same engine on the surface runs a dozen or so of the small pumps. Apart from the application of electricity for the pumping of water and drainage of collieries, it is contemplated to employ electricity for winding the coal in the pit. A good deal of this, heretofore, has been done by horse power. At Trafalgar there are forty-eight horses employed in the colliery, and their first cost, as well as subsequent maintenance, is an important item in the profit and loss account. In one station a powerful engine is employed in drawing coals, and likewise provides the motive power for working of the main pumps. It was stated that the cost of the steel ropes alone from this station was between £300 and £400, and this was equal to the cost of laying down the electric station and appliances already described, and that, moreover, there was a heavy cost involved in the wear and tear of lengthy ropes as employed. There are electric signals throughout the colliery, and the further experiments being made there are of the utmost importance to mine owners all over the world.

NEVADA COUNTY BULLION.—In the abstract of the report of the Director of the U. S. Mint as telegraphed to this coast, Nevada county, of this State, is only credited with some \$300,000 yield. The North Bloomfield, Milton and Enreka Lake hydraulic mines, on one ridge alone, a mere ink stain on the map of the county, produced double that amount, and the aggregate of two quartz mines would certainly aggregate all the county is credited with. It is probable a typographical error has occurred and that \$3,000,000 instead of \$300,000 was intended by the Mint Director, since Nevada county is, and has been for many years, our center of gold mining in this State.

Mines in Town Sites.

There have been a number of cases of litigation concerning the right of miners to mines on patented town sites. The great change which introduced an entirely new system of mining laws, differing from that of any existing government, was made by the Act of July 26, 1866, and it gave, with certain restrictions, legislative sanction to the laws and customs of "local authority" affecting possessory rights and the added privilege of acquiring title to the mine itself under the authority and forms of law. This change gave such rights, even against the government, as required modification of the town site provisions and resulted in the enactments of 1867 and 1868, with express reservations against the acquisition of mines or valid mining claims. The Revised Statutes now contain the several provisions with the subsequent amendments of the mining laws. The law first granted the town right, and afterwards abridged it only so far as to admit the new relations presented by the enactment of mining statutes, and the reason of the whole seems to result in this, according to the Secretary of Interior, who rules that by the acquisition of title to a town site no right remains to proceed for patent for mining ground under the reservations of law, except:

1st. For the mines, with only such incidents of surface ground and the like as are actually necessary to the use and operating of the same; and

2d. For such mine and possessory rights, including surface ground not in excess of that recognized by law at the date of location, as were acquired by the applicant or his grantors, privies in interest, before the legal inception of the patented town right.

But as with the grant of mines, the power to dig them is impliedly given, so the reservation of mines the power necessary to their enjoyment must be also reserved; and this reservation to and by the government must inure under the mining laws to citizens of the United States authorized to explore and possess them, and acquire the government title thereto.

If then, an applicant seeks to acquire patent for a mine (lode or vein), within a patented town site, based upon a location subsequent to such patent, he must be required to show affirmatively the existence of such mine and its true location, and prove his possessory right and value of work performed, as in other applications. He will not, however, be permitted to proceed as for a claim with surface claim, limited only by the usual statutory restrictions as to width along the vein, but will only be allowed to claim the necessary surface ground for the convenient working of his mine, in no case in excess of the legal width at date of the town-site appropriation. His plat must distinctly show the ground so claimed with relation to all other claims and the occupation and improvement of others, whether municipal or otherwise—and proof of such necessary possession and use must be furnished sufficient to make a clear *prima facie* showing of his right.

If such showing he made he may proceed to publication, and if no adverse claim is filed may obtain his patent, containing the usual town-site reservations, for the protection of any interest previously acquired.

Fresno Mines.

We are told that Messrs. Litchfield & B. F. Jones have leased the Texas Flat mine in Potter Ridge district, Fresno county, for two years, and afterwards get a bond on the mine during the period of the lease, the bond being for \$10,000 and 3,000 feet of ground. The mine has been rich in the croppings and was worked down until the pay body gave out, the lead having been lost. They started an incline down on the vein, the ore then gave out, but left a fine ledge matter. Search for an ore body had been pursued for some years on the surface, and all other places with the exception of the right one.

Messrs. Litchfield & Jones in commencing work cleared the incline of the debris, went down from fifteen to twenty feet and struck as fine a body of ore as was ever struck in Fresno county.

They continued to sink the incline in the ore for forty or fifty feet, and the ore has the same appearance on all sides and bottom. The ore contains a large percentage of sulphurets, of which the percentage runs from seven and a half to twenty-five per cent. The lowest assay averages \$153.75 per ton, but some very high assays have resulted from tests of the rock.

Among other mines of the neighborhood are the Fresno Flat Enterprise, Jim Lang, where they are building a mill, Last Chance, where there is a mill, and Spangle, which has a small but rich ledge. All these mines are working on excellent showing.

New Water Jacket Furnace.

Water jacket smelting furnaces are now used very extensively on this coast, for smelting copper and lead ores and their number is rapidly increasing. An improvement on this style of furnace has just been patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by John H. Canavan, of Globe, Arizona, by which the walls of the furnace are kept cool with the use of less water than usual, and the inventor claims, some 20 per cent less fuel. For convenience the upper half of the furnace may be made of cast-iron, with the tuyere-pipes cast on the inside, and it may be bolted to the lower part. This jacket is intended to be used both for water and for air, the water occupying the lower part, and the air, which is to be employed as a blast, being introduced into the upper part above the surface of the water through the blast-pipe. This pipe enters near the top of the exterior casing of the jacket, and, being bent sharply downward between the walls of the jacket, extends nearly to the bottom of the air-space.

The pipes connecting with the tuyeres, extend up to near the top of the jacket, so that the air which is discharged from the lower end of the pipe, must rise between the walls of the tuyere, where it is heated before it enters the tuyere-pipes, and a hot blast is thus produced to be discharged into the furnace. This current of air at the same time prevents the walls of the furnace at the upper part from becoming too much heated, while the water protects the lower part.

When the furnace is to be worked, water is admitted by an inlet-pipe, into the water-chamber in the lower part of the jacket, and is also admitted into the air-space through a cock, so as to rise to the level of another cock through which any surplus may be allowed to overflow. This water in the air-space remains as long as the air-blast is not used and protects the upper part of the furnace from too great heat. When the air-blast is to be admitted the cock at the bottom of the air-space is opened and the water allowed to run out. The air from the blast apparatus is admitted through the pipe and is discharged close to the bottom of the air-space of the jacket, whence it rises to near the top and is heated by its contact with the wall of the furnace before entering the tuyere-pipes. These pipes convey it down to the tuyeres, through which it is discharged into the lower part of the furnace. The water in the lower part and the blast of air passing through the upper part keep the walls of the furnace sufficiently cool without the necessity of keeping the whole jacket full of water. Whenever the blast of air is shut off water may be again admitted to the air-space.

Rapid Tunnel Work.

Some exceptionally rapid work is now being done by the Barleigh drilling machinery employed at the Big Bend tunnel, in Butte county, in this State. The following figures, showing progress for the month of May, will be of interest to miners:

Total number of holes drilled, 1,128; total depth of holes drilled, 7,033 feet; average depth of holes drilled, 6.25 feet; number of pounds of No. 1 powder used, 3,700; number of pounds of No. 2 powder used, 50; number of drills sharpened, 820; time occupied in drilling, 155 hours and 10 minutes; average time per shift, 1 hour and 40 minutes; number of carloads of rock extracted, 3,690; tunnel advanced for month, 360 feet; previously reported, 1,742 feet; total tunnel built to date, 2,102 feet; total number of shifts in month, 93; average progress per shift, 3.87 feet; average progress per shift, 24 hours, 11.61 feet; number of working days in month, 31; number of working shifts in month, 93.

Gov. TRITLE, of Arizona, says that Tucson shows the enterprising spirit of its people in the numerous enterprises projected and under way. The Board of Supervisors of that county has recently donated \$15,000 for the erection of a smelter and reduction works there and had carried out as far as they were concerned the provisions of the acts passed at the last Legislature, providing aid in the shape of bonds for the construction of two additional railroads. One is the Port Lobos, to be built from Tucson to the Gulf of California. The other is a narrow gauge, and will be built in the direction of Globe; hence it is contemplated by the aid and co-operation of Maricopa county to extend it to Phoenix.

THE coinage of the various mints for May was \$4,721,200, of which \$235,000 were standard dollars.

Improved Amalgamator and Settler.

A peculiar amalgamator and settler has just been patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Frederick Morris, of this city. It is made mostly of wood. A wooden platform is prepared having a central vertical post secured to it by bolts passing down through said post and platform. Around this post, on the platform, are fitted segmental blocks, forming a plate or disk, which is the bottom of the amalgamator or vessel. These blocks are nailed down to the platform. This construction is intended to obviate any shrinkage. The sides of the vessel are made of staves, the lower ends of which are nailed to the peripheries of the blocks forming the bottom. The staves are secured together by wooden hoops.

On the bottom of the vessel are laid segmental blocks or dies, which, by being made shorter than the blocks forming the bottom, leave a peripheral channel or groove. Their sides are also provided with thin strips, whereby they are separated sufficiently to form shallow radiating grooves. On the top of the central post is a cap which serves as a stop or bearing for a vertical shaft, which is journaled therein. On this shaft is the cross frame of the muller, in the arms of which are secured rods extending down within the vessel, nearly to the blocks. On these rods are loosely fitted the miller shoes or blocks, which pass along the bottom and adjust themselves vertically on the rods. A weight is placed on each shoe to keep it down to its place. The muller is revolved by a crown gear on top of the shaft, with suitable connections.

The device is for settling ore pulp in order to separate the heavy particles from the mud and slime after the ore has been ground. The revolving muller keeps the pulp agitated. The waste after separation is gradually forced to the center where it escapes. Two holes are made through the central post and platform which carry off the waste into a channel under the platform. These holes are not made at the very top of the post, but on a small ledge cut out nearly at the top. The escapes are easy to make and being right at the center and top, none, but the worthless part which has been fully separated and has risen to the top, will be discharged. The whole device is simple and economical and is put together in such a manner as to render it water-tight and durable.

White Pine Mines.

The condition of the mines at the old camp of Hamilton, White Pine county, Nevada, has much improved of late. The Sweetwater mining company, a New York corporation, has leased the "Old Saoky" mill, spent \$25,000 in new machinery and improvements, and has leased the water works from the Eberhardt & Aurora company to run it. This company has its second regular pay day on the 10th, and disbursed then \$7,000 among the employees, of whom there are at present thirty in their mines, and as many more in the mills. In the Stafford mine there is ore enough to keep the mill running for at least a year without any further prospecting, and there are 506 tons on the dump and at the mill.

Two large ore wagons are to be kept constantly running from the mines to the mill with ore.

At the Eberhardt and Aurora tunnel there are twelve men employed, and some fine quality ore is being brought out of it. Over 12,000 feet of tunnel, drifts and cross-ends have been made, and the pluck and perseverance of this company will doubtless be productive of good results. The general opinion prevailing in the camp is to that effect.

There are several small mines being opened by their owners, and more or less ore extracted. Now that the means to reduce ore cheaply will be furnished, a general revival of the mining interests in this once famous locality is confidently expected.

The Jenny A. mine, on White Pine mountain, is a very extensive and valuable property. There are immense deposits of low grade ore in sight, and rich ore in smaller quantities. The Superintendent, however, has been absent several months. With a proper amount of capital and necessary reduction works, which it is hoped will be supplied through the efforts of Mr. J. R. Kendall, the Jenny A. property will prove one of the best mines in the country.

At the Kennisbury mine there are ten tons of ore on the dump that will average \$300 per ton in silver. Some very fine ore is coming from the Hope mine and there are several others that are coming to the front as ore producers.

Timbering in Mines—No. 12.

If the sides of the roadway are strong, and the roof alone weak, the latter may be supported by timber resting upon the former. Such pieces are called head pieces, and they are let into the rock on each side, as beams are let into walls, to obtain a bearing. In thus placing the timbers, care is taken to give each piece sufficient and an even bearing at each end, so as to properly distribute the pressure. The distance of these pieces apart will, of course, be determined by the strength of the incumbent rock. To distribute the support of these pieces over the roof, and to prevent the fall of small portions of rock which become detached from the mass by atmospheric and other agencies, lagging is driven in between the head-pieces and the roof in a direction at right angles to the former. When slabs are used, the flat side is turned to the roof, in order to cover as large a surface as possible. Sometimes, especially in France, branches of trees are employed for this purpose, to form a network against the roof. The slab or planks are sufficiently long to reach at least from center to center

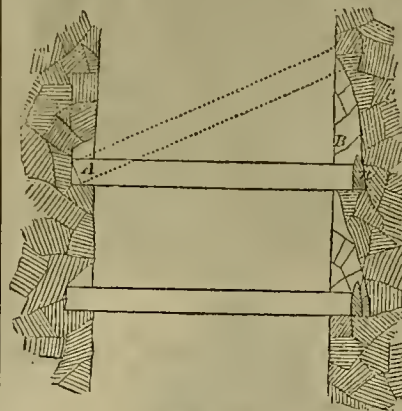


Fig 5. Fixing Timbers in Roof.

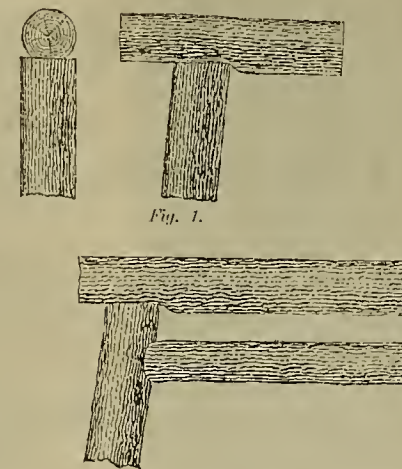


Fig. 1.

Fig. 2.

Fig. 3.

METHODS OF FRAMING ROUND TIMBERS

ter of two head-pieces, but it is better that they should rest upon three of these supports. To distribute the pressure equally over the headpieces, wedges are driven in between them and the roof wherever a space exists. The mode of inserting the headpieces will be understood from a reference to Fig. 5 of the accompanying engravings, which shows a plan of a drift with roof removed; in other words looking down on it. A hole or notch A is cut into the side rock near the roof, to a depth sufficient to give the requisite bearing, and made slightly broader than the timber to be inserted, in order to allow the play required by the operation. On the opposite side of the excavation, a similar hole B is cut; but the fore side of the hole is cut away in the manner shown in the figure, for the purpose of allowing the headpiece to be inserted. The mode of introducing the headpiece is shown by the dotted lines. Before, however, the end has been thrust into its definite position, a wedge is placed at *u*, with its thin end outwards, and against this the headpiece is driven until a sufficient degree of tension has been given to it.

It may sometimes happen that one side of the excavation, as well as the roof, needs support. In such a case a method of half timbering is adopted. A hole, similar to that at A, in Fig. 5, is cut into the side roof, to receive one end of the headpiece, or cap, as it is frequently termed.

A shallow is also cut in the floor, to receive the end of the timber that is to stand vertically on that side. This vertical piece is variously described as "upright," "leg" or "stanchion." The stanchion is set in an inclined position in this

hole, usually with its smaller end downwards, and the headpiece having been placed with one of its ends in the hole in the rock, cut for it, and its upper end resting upon the upper end of the stanchion, the latter is driven into the vertical position. By this means sufficient friction is developed to hold the two pieces firmly together. If, however, in consequence of the yielding of the floor, or a miscalculation in the length of the stanchion, this friction is not obtained, wedges must be driven either beneath or above the stanchion.

As it is desirable not to weaken the timber by notches or any unnecessary cuts, care will be required in preparing the bearing surfaces. In most cases these surfaces will be held together by friction alone, and two methods of preparation may then be adopted. In one the lower side of the cap is cut away with the axe in a slight degree, so as to give a flat bearing surface. The upper end of the stanchion is in this case cut off square. In the other method, the upper end of the stanchion is hollowed out to receive the round surface of the cap. These methods, as used with round timbers are shown in Figs. 1 and 2.

Whatever be the method adopted, it is important to make the cap bear evenly upon the stanchion, so as to avoid any tendency to split the pieces when the pressure comes upon them. Sometimes the lateral pressure from the sides of the excavation will be greater than the down-



Fig. 3.



Fig. 2.

Academy of Sciences.

At the regular meeting of the Academy, on Monday evening last, Hon. Chancellor Hartson was elected a resident member. Rolt, E. C. Stearns, Ph. D., read a paper "On the Molluscan Fauna of the Colorado Desert and Regions East Thereof." He first spoke of the extinct phylas, or fossil pond snails, found at Indian station, on the Southern Pacific railway, and of the fresh water mussel shells of the same region, commonly called the *Anodonta Californiensis*. He said the Colorado basin was once a great lake or series of lagoons, 150 miles in length, some portions of which are now 1953 feet below the ocean level. This whole region bears marks of having undergone great depressions, and also great elevations between the middle tertiary and the close of the tertiary era—surely, before the early quaternary. This whole field of economic geology is an unworked one. *Physa*, meaning pouch, is applied to a family of fresh water shells. At Indian, San Diego county, they are found twenty-seven feet below the old sea line. Salt water shells found at a greater depth are older than the more recent fresh water forms. Similar shells are found on Santa Barbara Island, off the coast, indicating that formerly a connection existed between the head of the Colorado basin and the Santa Barbara channel. In dry regions these shells are white, and in wet places they are darker externally.

Colonel George E. Gray, Chief Engineer of the Southern Pacific Railroad, said at one period the waters of the Pacific Ocean flowed beyond Indian station, and the waters of the Gulf of California extended far inland along the Colorado basin. Marks of a submergence extend over a large area, and subsequently a sedimentary filling up was deposited in the lowest localities. He thought a scientific examination of the old water line of the old Colorado basin or desert would develop many interesting facts likely to lead up to data of very general interest.

Dr. H. W. Harkness spoke of the disease affecting our sycamore trees, which now appears more general than at any time for twelve or fourteen years past. It results from the attacks of a fungus which kills the leaves and finally destroys the tree. This pest began in the Eastern States about the year 1739, since which it has made steady progress and threatens to exterminate the sycamore trees all over our continent.

John G. Lemmon and his wife, presented and explained 96 Arizona plants from the Huachuca mountains.

Professor Davidson made some remarks on D'Arrest's comet which we give in another column.

D'Arrest's Comet.

At the meeting of the Academy of Sciences on Monday evening, Prof. Davidson stated that as a matter of interest to astronomers Mr. Hind gives certain data which indicate that the chance of seeing the comet at this present visit is very slight indeed. On the 6th of June at Greenwich, mean midnight, the predicted right ascension of the comet is 13 hours and 9.6 minutes, and the north declination 12 degrees and 48 minutes, when its distance from the earth will be 190 millions of miles, and from the sun 243 millions of miles, whilst the intensity of its light will be only one fourth of the lowest value at which the comet has hitherto been observed. This low degree of light will continue to August, and then slightly increase until the end of December, when it will be three times brighter than in the summer months. And yet it is very doubtful whether it can be seen, especially as it will then set about two hours and eight minutes later than the sun.

The theoretical intensity of the light of a comet, considered as unity, is represented by the reciprocal of the product of the squares of the distances of the comet from the earth and from the sun.

So far the search for the comet has been unsuccessful, and Mr. Common reports that with his larger reflector he has been unable to find it; but he notes the surprising number of faint nebulae which are lying along its predicted track.

This comet is one of the short period comets, having a period of 6.44 years, and an aphelion distance of 5.75; and thus belongs to the group of comets and meteor streams whose aphelion distances are near equal to the radius of the orbit of Jupiter (5.20). It was observed in 1851, 1857, 1870 and 1877.

The orbit of this comet almost intersects that of the lost comet of De Vico, in heliocentric longitude 33° 37', and with the elements of 1851 the distance between the orbits was only 507,000 miles.

De Vico's comet is another of the short period group with a period of 5.49 years, and an aphelion distance of 5.02, or within the orbit of Jupiter.

The prosperous Colorado mining town, Chaffee City, will, after July 1st, be known as "Monarch" upon the official postal guide. The Postmaster General has, upon the request of the miners, ordered the change to be made. The mineral developments in the vicinity of Monarch are unusually large and promising, and investors are looking that way.

JOHN H. MARTIN, of Oroville, Butte county, in this State, inventor of an improved hydraulic elevator for working gravel mines, has left for Gunnison City, Colorado, under an engagement to a company of capitalists, who intend to open and work hydraulic mines on the Gunnison river, within the limits of the Indian reservation, where Colonel Thornburg and Agent Meeker met their fate.

MR. ROLCKER, late Superintendent of the Chrysolite mine, Colorado, and lately employed in the interest of the Copper Prince, Arizona, has gone to Sonora to inspect some prospects for New York parties.

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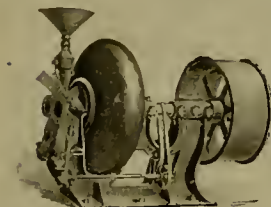
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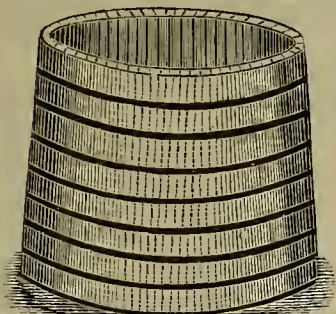
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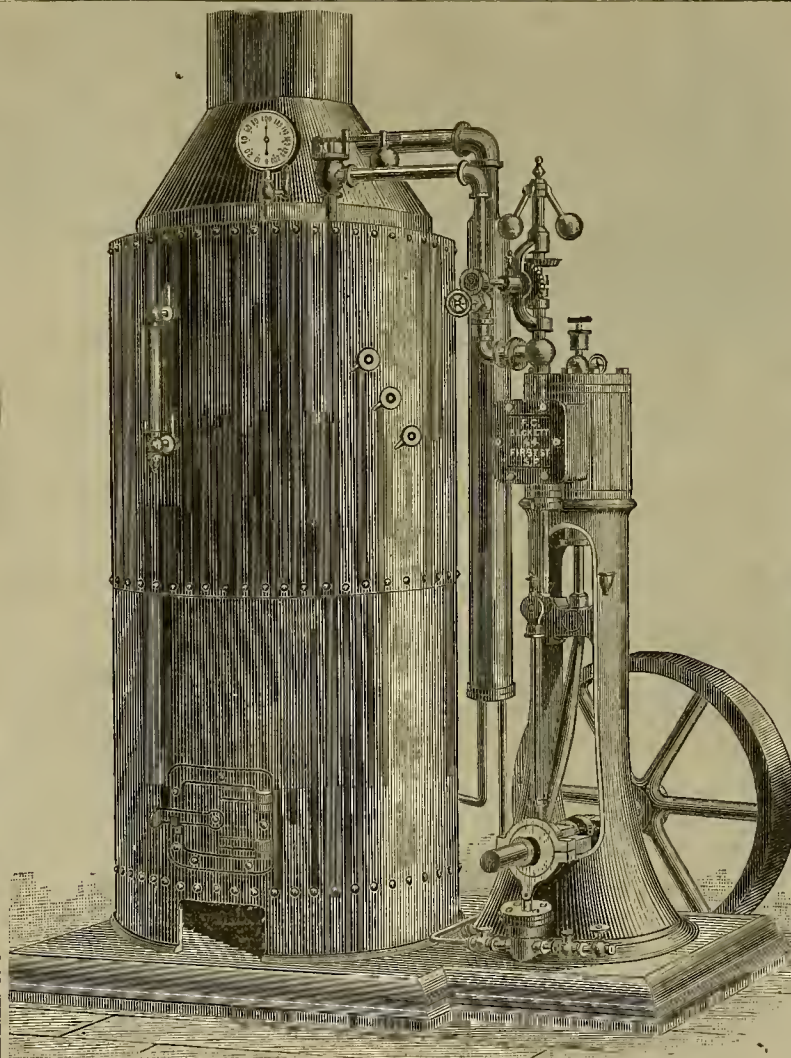
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This is the only Scientifically Constructed Bucket in the market. It is struck out from charcoal stamping iron. No corners to catch. No seams to burst. No interior corners to clog up. It runs with great ease, and half the power of the old style bucket. WILL OUT-WEAR HALF A DOZEN OF THEM.

PRICES REDUCED.

T. F. ROWLAND, Sole Mfr.
Brooklyn, N. Y.

H. P. GREGORY & CO., Agents, San Francisco, Cal., carry a stock of all sizes.

PACIFIC POWER CO.

Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

"DUNCAN"**ROCK DRILL!**

FOR MINES, QUARRIES, ETC.

J. CUYAS, Agent,

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RICHARD C. REMMEY, Agent.**Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of Chemical Stoneware —FOR— Manufacturing Chemists. Also Chemical Bricks for Glover Tower.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

- FOR WEEK ENDING MAY 29, 1883.
- 278,482.—DREDGER CHAIN—H. R. Angell, S. F.
278,652.—CASTING STEROTYPE PLATES—Chas. Bachelder, Portland, Oregon.
278,405.—CARPENTER'S BEVEL—Cummings & Van Amringe, Oakland, Cal.
278,317.—LIFFING JACK—Jas. Dawson, S. F.
278,325.—DRY ORE CONCENTRATOR—W. B. Farwell, S. F.
278,422.—TUCKER ATTACHMENT FOR SEWING MACHINES—Fisher & Hart, S. F.
278,355.—APPARATUS FOR MAKING CARBON PLATES—Molera & Celvian, S. F.
278,451.—VALVE GEAR FOR STEAM ENGINES—E. O'Neill, S. F.
278,607.—AUTOMATIC HANGING UP ATTACHMENT FOR LABEL VARNISHING MACHINES—Schmidt & Rahskopf, S. F.
278,612.—FLUOR PLUGGING DEVICE—F. Sharp, Los Angeles, Cal.
278,474.—HARNESS COUPLING—L. Wartenberg, Anaheim, Cal.
278,632.—HARROW—J. A. Thronson, Daton, W. T.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press American and Foreign Patent Agency, the following are worthy of special mention:

DREDGER CHAIN.—Horace B. Angell, S. F. No. 278,482. Dated May 29, 1883. This invention relates, generally, to improvements in drive chains of that class in which the ends of adjoining links are pivoted upon and connected by a transverse pin; and these improvements are applicable to chains used in dredging machines for elevating the buckets and lowering them again to their work. Chains of this class are exposed, in addition to the ordinary wear caused by the longitudinal strain of one link upon another, to the destructive grinding action of sand and other gritty substances, which work their way into the joint between the links, and in a very short time destroy the bearing surfaces. When these links are connected by a simple steel pin, it has been found that in a very few days the wear causes the joint to work loose and in a short time become unfit for use. Attempts have been made to remedy this difficulty, by surrounding the pin with a tubular bushing of hard steel, which could be renewed when worn out. It was found, however, that the wear upon this bushing was so great and so speedy, that there was necessity for continual renewing of the bushing at some point or other in the length of the chain, and the utility of the chain was thereby greatly lessened and the expense, not only of manufacturing but of keeping it in repair, correspondingly increased. Mr. Angell's invention consists in a peculiar sectional bushing interposed between the pin and the bearing surface of the link, each section of which shall be of such a width as to cover the bearing surface of the eye within which it is held.

VALVE GEAR FOR STEAM ENGINES.—Eugene O'Neill, S. F. No. 278,451. Dated May 29, 1883. These improvements in valve gear consist mainly in a mechanism by which the eccentrics actuate the valves, and in an improved construction of the valves and their seats, and also in a means for connecting the exhaust valve stem with the actuating levers. In the mechanism already patented by Mr. O'Neill, the steam and exhaust valves are both operated from above by suitable stems; but the stems of the exhaust valves pass up through hollow sleeves, and their seats must be removed through the top, thus requiring considerable work when it is necessary to gain access to the exhaust valves. In the present invention, each steam valve has a stem passing up through the top of the steam chest, and connected with the actuating mechanism. The exhaust valves have stems which pass downward through stuffing boxes at the bottom.

CARPENTER'S BEVEL.—James B. Cummings and B. F. Van Amringe, Oakland, Alameda Co. No. 278,405. Dated May 29, 1883. The invention relates to that class of carpenter's instruments or tools known as "bevel squares," and it consists in a blade pivoted in each end of the slotted stock, and in the formation of the ends of said blades. The object is to combine in one instrument two blades, so formed and capable of such adjustment as to answer the purpose of two separate bevels and a square in the most convenient manner.

THE mines at Gold Park still remain closed down.

THE feeling of languor and debility that follows physical exertion, removed by using Brown's Iron Bitters.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walked with aquaria constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

Meetings and Elections.

CHOWN POINT G. AND S. M. Co.—June 5th. Directors: C. L. Weller, President; R. P. Morrow, J. P. Jackson, A. K. P. Harmon, and J. H. Dobinson. James Newlands continues as Secretary, and Sam. L. Jones as Superintendent. The company had a cash balance on June 1st of about \$22,000.

YELLOW JACKER M. Co. June 1st. The meeting of this company is thus reported by the Virginia Enterprise: The resignation of Joseph R. Ryan was read by Secretary Otey. George D. Edwards, of S. F., was elected to fill the vacancy. The resignation of R. H. Pollis was read. John W. Eckley was elected to fill the vacancy. The resignation of A. M. Cole was read. W. E. Sharon was elected to fill the vacancy. The resignation of Mercer Otey as Secretary was read by Secretary Otey. W. H. Blauvelt was elected to fill the vacancy. George D. Edwards was then elected as Vice-President. The Bank of California was elected Treasurer, vice the Nevada Bank. Captain Taylor continues as President and Superintendent. Serreta Otey will remain in the company's employ till the annual election (July 16th), to close up the year's accounts and initiate his successor.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY C. HANSEN, State Mineralogist.]

[CATALOGUE.]

4924. Silver Ore—Mina de Prais, State of Tolima, U. S. de Colombia, S. A. Carlos Faulhaber. This is an old Spanish mine reopened in the year 1882. It has given large returns to the owner, but belongs now to an English company. The ore body on the 500-foot level is 18 feet across. The ore is crushed in the mine and sent to England for reduction.

4925. Silver Ore—Mina in Pava, State of Cauca, U. S. de Colombia, S. A. This mine was started fourteen years ago. It is not worked with any system, but has yielded a great deal of silver. The reduction is by barrel amalgamation. Carlos Faulhaber.

4926. Silver Ore—Mina in Soledad, State of Antioquia, U. S. de Colombia, S. A. This is a new mine; ore vein three to four feet broad, and but little work being done on it. Carlos Faulhaber.

4927. Silver Ore—Mina Guadalupe, State of Cauca, U. S. de Colombia, S. A. This is a very large mine, is well opened, and is beginning to pay well. Carlos Faulhaber.

4928. Nelson's Island (London). Recent Shell, Viti Island, South Seas. Thomas Griffin.

4929. Crystallized Chumbar in Crystallized Calcite—Guaia Lupa mine, Santa Clara county, Cal. Henry May.

4930. Calcite, Technical Quartz, Piche, Lincoln county, Nev. Mrs. H. H. Day.

4931. Free Gold in Spar—Haver Hill Gold Mining Co., Thompsonville, Davidson county, North Carolina. J. Z. Davis.

4932. Conglomerate—Pioneer district, Gila county, Arizona. Charles H. Constock.

4933. Pebbles from the Harbor of Lubek, Baltic Sea, Germany. James Lechros.

4934. Anglesite (Sulphate of Lead) Sierra Mosado, Durango, Mexico. H. H. Ward.

4935. Chumbar, Santiago, Durango, Mexico. H. H. Ward.

4936. Tin Ore (Cassiterite) Cuernito, Durango, Mexico. Soil to be found in large quantities. Altitude of the mines, 12,000 feet. H. H. Ward.

4937. Rich Silver Ore—American Flag mine, Socorro county, New Mexico. Frank Drake.

4938. Rich Silver Ore—Yavahoe mine, Grafton, Socorro county, New Mexico. Frank Drake.

4939. Copper Ore (high grade), Silicate and Oxide, Chery, Chumbar and Chumbar. Frank Drake.

4940. Copper Ore (low grade). Yielding from three to five per cent of copper, but which can be smelted with a small profit. (See No. 4939.) Frank Drake.

4941. Iron Ore—Used as a flux in copper smelting. (See No. 4939.) Frank Drake.

4942. Calcite—Used as a flux in copper smelting. (See No. 4939.) Frank Drake.

4943. Copper Ore—Partly smelted in Water Jacket furnace. (See No. 4939.) Frank Drake.

4944. Slag—Formed in copper smelting with Water Jacket furnace. (See No. 4939.) Frank Drake.

4945. Copper Bullion—Containing 381 ounces of silver to the ton, obtained in Water Jacket furnace. (See No. 4939.) Frank Drake.

4946. Rock Specimens, 20 varieties—Sierra Madre, Durango, Mexico. Thomas Gilmore.

4947. Rich Silver Ore (Emballite)—Pintarch mine, Calico district, San Bernardino county, Cal. John Daggett.

4948. Rich Silver Ore, coated with Emballite—Garfield mine, Calico district, San Bernardino county, Cal. John Daggett.

4949. Silver Ore—Occidental mine, Calico district, San Bernardino county, Cal. S. Heydenfeldt, Jr.

4950. Silver Ore—Golconda mine, Calico district, San Bernardino county, Cal. Mrs. Townsend.

4951. Stone implement, supposed to have been used by the Indians in grinding and preparing paint—Found in a cave 150 feet deep, Calico district, San Bernardino county, Cal. Jas. Gould.

4952. Silver Ore—Veto mine, Calico district, San Bernardino county, Cal. Charles Kaufman.

4953. Barite (Sulphate of Barium)—Calico district, San Bernardino county, Cal. S. Heydenfeldt, Jr.

4954. Silicate (Gypsum)—Calico district, San Bernardino county, Cal. S. Heydenfeldt, Jr.

4955. Ulexite (Borate of Lime)—Fish Lake valley, Esmeralda county, Nev. W. D. Linton.

4956. Ulexite, variety usually called "Sheet Cotton," containing Boracic Acid—Death Valley, Inyo county, Cal. J. Danvers.

4957. Borax—Made from Ulexite (Borate of Lime) decomposed with Carbonate of Soda. J. Danvers.

4958. Porphyriferous Rock—Near Soledad, San Diego county, Cal. W. C. McDonald.

4959. Slate—Near Red Hill, Butte county, Cal.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

- G. W. McGrew—Santa Clara county.
M. P. Owen—Santa Cruz county.
J. A. W. Wright—Merced, Tulare and Kern counties.
JARED C. HOAG—California.
B. W. CROWLEY—Arizona Territory.
N. H. BARRETT—Phonax county.
M. H. JOSEPH—Eureka, Nev.
L. M. LEWIS—Los Angeles, San Bernardino and San Diego counties.
A. C. KNOX—Oregon and Washington Ter.
F. W. STRATTON—Sierra and Yuba counties.
J. J. BARRETT—Yolo county.
JAMES W. BOYER—Sacramento county.

COMPLIMENTARY SAMPLES of this paper are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times,) by turning a leaf.

News in Brief.

BISMARCK has been chosen as the capital of Dakota.

SAN FERNANDO is to build a new and elegant school house.

HANLAN, the famous oarsman, is coming to California in September.

THE San Joaquin Valley Agricultural Association will offer \$30,000 in premiums this year.

THE Geyser stage capsized the other day, going down the grade with a lot of passengers, but no one was hurt.

A CYCLONE did considerable damage in Texas and Alabama Sunday. Several persons were killed and much property destroyed.

OKANSHI is the name of a new watering place just laid out on the line of the California Southern railroad, in San Diego county.

BURCHARD, Director of the Mint, left Washington Saturday upon an official visit to the mining regions of the Western States and Territories.

It is stated that the railroad company will try the experiment of making its cars at Seattle, W. T., with a view to establishing a manufactory there.

THE *Belgarica* left Queenstown Thursday with 700 State-aided emigrants, and the *Phonix* left Glasgow on the 30th with 290 of the same class of passengers.

THE rainfall during the last month was phenomenal, being 3.52 inches. The nearest approach to this figure during fourteen years was in 1879, when 2.35 inches of rain fell.

THE members of the Salvation Army have been notified by the Chief of Police of New Haven, Conn., that they must stop street singing in future, under penalty of arrest.

It is whispered that the engineers, conductors, brakemen and other employees of the Northern Pacific west of San Antonio, are organizing a strike on account of a recent ten per cent reduction.

THE new grain wharf at Port Costa will cost \$250,000; employs 175 men in its construction; will be finished by July 1st; 320 feet will be utilized as a warehouse, capable of storing 100,000 tons of grain.

New Life

is given by using BROWN'S IRON BITTERS. In the Winter it strengthens and warms the system; in the Spring it enriches the blood and conquers disease; in the Summer it gives tone to the nerves and digestive organs; in the Fall it enables the system to stand the shock of sudden changes.

In no way can disease be so surely prevented as by keeping the system in perfect condition. BROWN'S IRON BITTERS ensures perfect health through the changing seasons, it disarms the danger from impure water and miasmatic air, and it prevents Consumption, Kidney and Liver Disease, &c.

H. S. Berlin, Esq., of the well-known firm of H. S. Berlin & Co., Attorneys, Le Droit Building, Washington, D. C., writes, Dec. 5th, 1881:

Gentlemen: I take pleasure in stating that I have used Brown's Iron Bitters for malaria and nervous troubles, caused by overwork, with excellent results.

Beware of imitations. Ask for BROWN'S IRON BITTERS, and insist on having it. Don't be imposed on with something recommended as "just as good." The genuine is made only by the Brown Chemical Co. Baltimore, Md.

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

Seaton Gold Mining Company.—Location.

Principal place of business, San Francisco, California. Location of works, Drytown, Amador county, California.

NOTICE.—There are delinquent upon the following described stock, on account of Assessment No. 2, levied April 10, 1883, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Scott, E. A.	4	10	\$ 75
Warner, Alex.	5	10	75
Martin, A. Trustee.	6	5,000	375 00
Martin, A. Trustee.	7	5,000	375 00
Martin, A. Trustee.	8	5,000	375 00
Martin, A. Trustee.	9	5,000	375 00
Martin, A. Trustee.	10	1,000	75 00
Martin, A. Trustee.	11	1,000	75 00
Martin, A. Trustee.	12	1,000	75 00
Martin, A. Trustee.	13	1,000	75 00
Martin, A. Trustee.	14	1,000	75 00
Martin, A. Trustee.	15	1,000	75 00
Martin, A. Trustee.	16	1,000	75 00
Martin, A. Trustee.	17	1,000	75 00
Martin, A. Trustee.	18	1,000	75 00
Martin, A. Trustee.	19	1,000	75 00
Martin, A. Trustee.	20	500	37 50
Martin, A. Trustee.	21	500	37 50
Martin, A. Trustee.	22	500	37 50
Martin, A. Trustee.	23	500	37 50
Martin, A. Trustee.	24	500	37 50
Martin, A. Trustee.	25	500	37 50
Martin, A. Trustee.	26	500	37 50
Martin, A. Trustee.	27	500	37 50
Martin, A. Trustee.	28	500	37 50
Martin, A. Trustee.	29	500	37 50
Martin, A. Trustee.	30	4,000	300 00
Martin, A. Trustee.	31	900	67 50
Davis, John A.	32	30	2 25
Martin, A. Trustee.	33	5,000	375 00
Martin, A. Trustee.	34	5,000	375 00
Martin, A. Trustee.	35	5,000	375 00
Martin, A. Trustee.	36	4,900	367 50
Kellogg, C. W.	37	100	7 50
Martin, A. Trustee.	38	5,000	375 00
Martin, A. Trustee.	39	5,000	375 00
Martin, A. Trustee.	40	5,000	375 00
Martin, A. Trustee.	41	5,000	375 00
Martin, A. Trustee.	42	5,000	375 00
Martin, A. Trustee.	43	10,000	750 00
Fischer, Bertha C.	44	100	7 50
Cornwall, P. R.	45	4,800	360 00

In accordance with law, and an order of the Board of Directors, made on the 10th day of April, 1883, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at 528 California St., Room 6, San Francisco, Cal., on THURSDAY, the 5th day of June, 1883, at the hour of 1 o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expense of sale.

A. MARTIN, Secretary.

OFFICE—Room 6, 528 California St., San Francisco, California.

POSTPONEMENT.

The above sale of delinquent stock is hereby postponed to THURSDAY, the 28th day of June, 1883, at 1 o'clock p. m., at the same place. By order of the Board of Directors.

A. MARTIN, Secretary.

San Francisco, June 6, 1883.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, June 2, 1883.

At a meeting of the Board of Directors of the above named company held this day, Dividend No. 55, of twenty-five cents (25c.) per share, was declared, payable THURSDAY, June 12, 1883, at the Farmers' Loan and Trust Company, in New York, or at the office in this city.

WILLIAM WILLIS, Secretary.
OFFICE—Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, Cal.

Books for Miners and Millmen.

KUSTEL'S CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for gold-bearing sulphurates, arsenurates, and gold and silver ores generally, with 120 lithographic diagrams. 1867. This work is unequalled by any other published embracing the subjects treated. Post-paid, \$7.50. Printed and sold by Dewey & Co., S. F.

KUSTEL'S ROASTING OF GOLD AND SILVER ORES (Second Edition, 1880), and the Extraction of their Respective Metals without Quicksilver. Illustrated, 156 pages. A valuable and carefully written work. Post-paid, \$3. Sold by Dewey & Co., S. F.

AARON'S LEACHING GOLD AND SILVER ORES.—The most complete hand-book on the subject extant, 164 pages (clavo illustrated by 12 lithographic engravings and four wood cuts. Fully indexed. Plainly written for practical use in cloth, \$3. Sold by Dewey & Co., S. F.

THE EMPLOYER'S MINER'S AND METALLURGIST'S COMPANION, by J. S. Phillips, M. E., comprising a practical exposition of the Various Departments of Exploration, Mining, Engineering, Assaying, and Metallurgy, containing 672 Engravings and 33 Engravings. Price, bound in cloth, \$10.50. Sold by Dewey & Co., S. F.

MINING, ENGINEERING, MECHANICAL, FARMING, SCIENTIFIC, INDUSTRIAL AND NEW BOOKS in general can be ordered through Dewey & Co., publishers of the MINING AND SCIENTIFIC PRESS, S. F., at publishers' rates.

PHILLIPS' EXPLORER'S AND ASSAYER'S COMPANION (Third Edition). Price of Vol. 1, post-paid, \$6. Sold by Dewey & Co., S. F.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent.

"Challenge" Ore Feeders.

OVER 1100 HAVE BEEN IN SUCCESSFUL OPERATION.

Awarded First Premiums at the Preceding and last Industrial Fairs of the Mechanics' Institute of San Francisco.

TWENTY PER CENT. MORE ORE CRUSHED WITH FIFTEEN PER CENT. LESS WEAR OF IRON THAN BY THE OLD METHOD OF HAND-FEEDING.

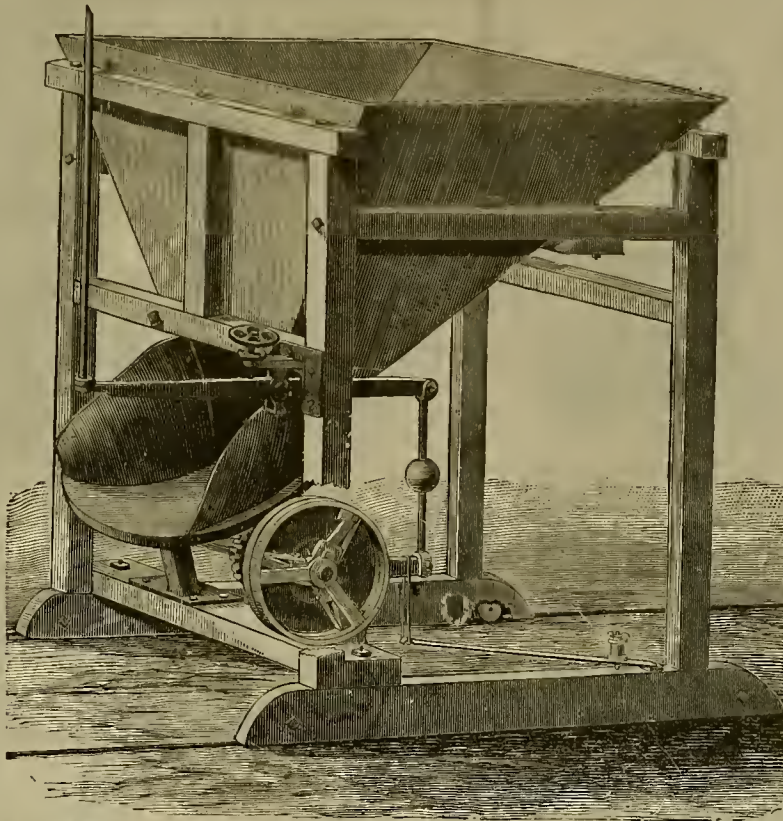
The opposite cut illustrates two recently introduced O.P. and S. H. Attachments, which replace the Weight originally used and result in an obvious improvement.

The practical operation of the large number of these machines now in use demonstrates the fact that the principle upon which a perfect Ore Feeder must be constructed is that of a carrier and not that of a shaking table. Uniform feeding is not possible upon the latter plan. The ore must be gently carried upon a steady, advancing plane or table to the line or point of discharge, and there be simply dropped. Jerky or spasmodically acting contrivances will not answer the purpose for feeding wet or sticky ores, nor for the ores of mines where they may change from sharp quartz to an interstratified material of quartz and earthy matter.

The Feeders are in Successful Practical Operation in the Following Quartz Mills, and are giving Perfect Satisfaction to their Managers.

Compton's	10	Stamps	Mariposa county, Cal.
Souley	20	"	"
Patterson	20	"	"
Sheep Ranch	20	"	"
Mahoney	10	"	"
Zile	10	"	"
Pacific	40	"	"
Nashville	20	"	"
Gross	30	"	"
Jellison	20	"	"
St. Patrick	15	"	"
Providence	40	"	"
Embo	20	"	"
Idaho	30	"	"
Green Mountain	60	"	"
Plumas-Eureka	60	"	"
Bulwer-Standard	30	"	"
Standard	20	"	"
Noonan	30	"	"
Big Dry Creek	10	"	"
Mexico	14	"	"
Santiago	32	"	"
Vivian	16	"	"
Christy	5	"	"
Contention	20	"	"
Grand Central	20	"	"
Sunshine	20	"	"
Homestead	30	"	"
Father de Smet	80	"	"
Hidden Treasure	40	"	"
Highland	120	"	"

And in many other Mills in the Mining Districts of the entire United States, and as well in Nova Scotia and Australasia. The superiority of these Feeders over other manufactures has been so thoroughly demonstrated that it is not deemed pertinent to cite the numerous instances of this fact.



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THE "JOSHUA HENDY MACHINE WORKS,"

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Manufacturers of Quartz, Saw Mill and General Machinery. Agents for "BAKER" ROTARY PRESSURE BLOWERS, WILBRAHAM ROTARY PISTON PUMPS, P. BLAISDELL & CO.'S MACHINISTS' TOOLS, and the Celebrated "HOT POLISHED SHAFTING," from the Akron Iron Company, Akron, Ohio. Also Manufacturers of New and Dealers in Second-Hand Boilers, Engines and all Descriptions of Machinery.

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Geo. H. Strong, W. B. Ewer, A. T. Dewey

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EXCELSIOR BLASTING POWDER,

Manufactured by the

EXCELSIOR POWDER COMPANY.

This is no new, potent, non-explosive Safety Powder, but the Genuine Standard Nitro-Glycerine Powder, as safe to use and handle as any other. Nitro-Glycerine Powder manufactured. The fumes and gases, common in nitro-glycerine powders, are destroyed, and do not leave the miner with headache or nausea.

The powder is put up in cartridges of any size to suit the consumer, and is exploded in the same manner as all other high explosives; that is, by means of cap and fuse, or by electricity. It is not claimed for this powder that it is a non-explosive, or safer than other nitro-glycerine powder. All powder, and especially nitro-glycerine powder, should be handled carefully. The EXCELSIOR POWDER is as safe, and for strength far surpasses any other powder on the market. Address all orders to

EXCELSIOR POWDER COMPANY,

Room 9, No. 3 California St., San Francisco, Cal.

FOR SALE

By J. M. LAKENAN, of Grass Valley Foundry, Grass Valley, Cal.

One 20-inch bore engine, 24-inch stroke; one 18-inch bore engine, 40-inch stroke, Meyer's cut-off; one 14-inch bore engine, 36-inch stroke, Meyer's cut-off; one 12-inch bore engine, 30-inch stroke; two sets heavy pumping gear, with 100 and connecting rod irons, etc.; 450 feet of 16-inch pump pipe of 1-inch iron, heavy flanges; besides other mining and milling machinery.

For information, address J. M. LAKENAN, Grass Valley, Cal.

JOHN L. BOONE,

Attorney and Counsellor-at-Law,

Rooms 7 and 9,

No. 320 California Street, S. F.

(Over Wells Fargo & Co.'s Bank.)

Special Attention Paid to Patent Law.

N. B.—Mr. J. L. Boone has been connected with the Patent business for over 15 years, and devotes himself almost exclusively to Patent litigation and kindred branches.

Inventors L. PETERSON MODEL MAKER.

253 Market St., N. E. cor. Front, up-stairs, San Francisco. Experimental machinery and all kinds of models, tin, copper and brass work.

Patent Life-Saving Respirator.

PREVENTS LEAD POISONING AND SALIVATION.

Invaluable to those engaged in dry crushing quartz mills, quick-silver mines, white lead corrodins, feeding thrashing machines and all occupations where the surrounding atmosphere is filled with dust, obnoxious smells or poison vapors. The Respirators are sold subject to approval after trial, and, if not satisfactory, the price will be refunded. Price, \$3 each, or \$30 per dozen. Address all communications and orders to

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43 Sacramento Street, San Francisco, Cal.



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Dewey & Co. { 252 Market St. } Patent Agt's

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TRINITY SCHOOL,

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Church, Boarding & Day School for Young Men & Boys. Prepares for College and University. For Information, address REV. E. B. SPAULDING, Rector.

X X

MILLS SEMINARY.

The next term of this well-known Institution will commence on

Wednesday.....August 1, 1883,

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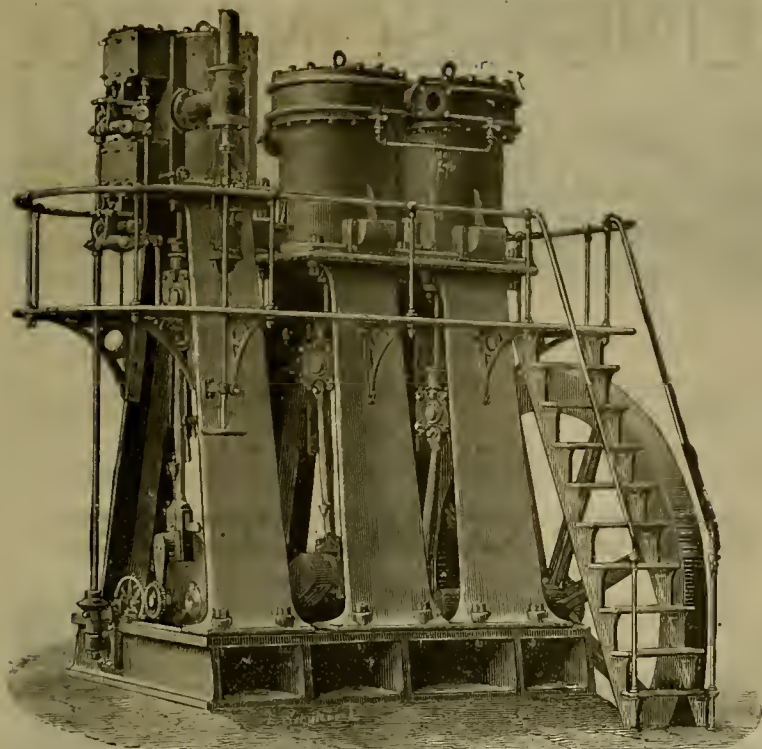
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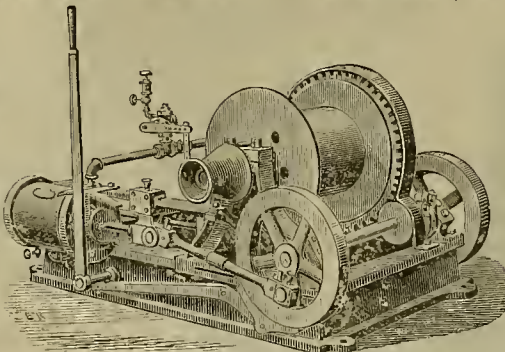
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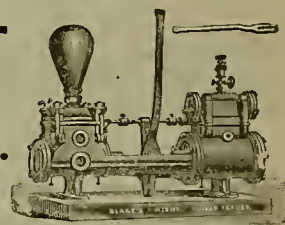
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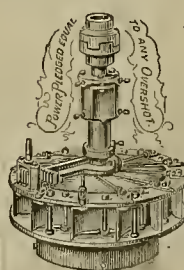
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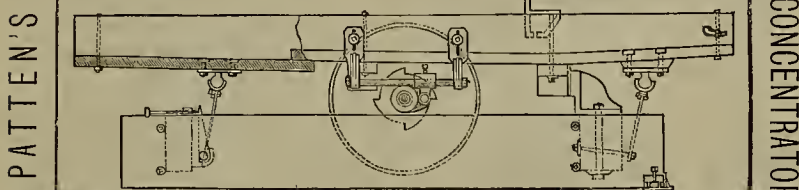
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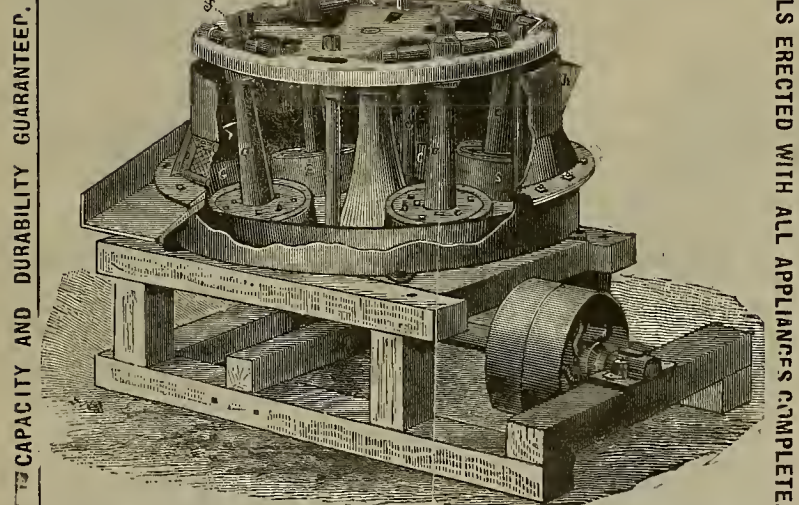
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3. Cost of erection at mine one-tenth that of stamps.
4. It runs with one-third the power per ton of ore crushed.
5. The wear is less than that of stamps.
6. The wearing parts are easily duplicated.
7. It has a much better discharge, and leaves the pulp in better condition for concentrating.
8. It is a better Amalgamator, saving fully nine-tenths of the gold in the mill; the balance can be saved on plates in the usual manner.
9. It is continually crushing; not like the stamp, using power to suspend it in air ninety-nine one-hundredths of the time, and the balance making a thundering noise, and accomplishing comparatively small results. It is as far in advance of the stamp mill as the present method of making flour with improved rolls is over the Indian's mode of crushing corn in a stone mortar.

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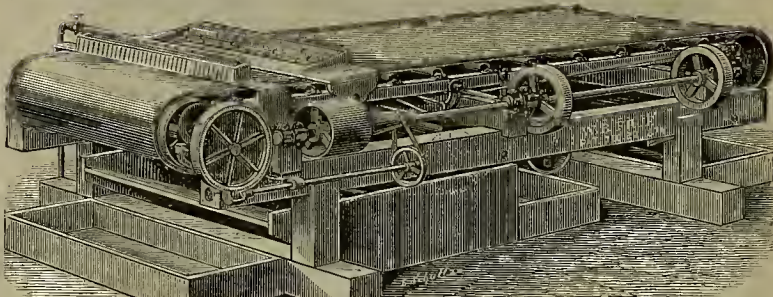
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To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

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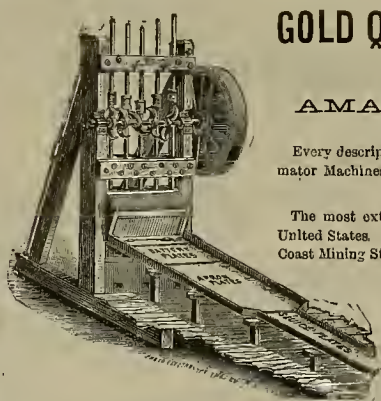
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An Illustrated Journal of Mining, Popular Science and General News-

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SAN FRANCISCO, SATURDAY, JUNE 16, 1883.

VOLUME XLVI
Number 24.

Timbering in Mines.—No. 13.

When both sides of the excavation as well as the roof are weak, which is the most common case, the form of timbering adopted will be similar to that shown in the accompanying engraving. Sawed, hewed or round timber may be used as convenient. In this case we have two stanchions, surmounted by a cap or head-piece, and the timbers are put together by notching or otherwise, according to circumstances. Generally, in levels driven by hand labor, the two stanchions are slightly inclined toward the axis of the excavation, so as to give a trapezoidal section, as shown in the figure. In such a case the timbers are not placed normally to the stratification, but their position is favorable to stability. One advantage of this position of the stanchions is the consequent reduction in the length of the headpiece, without a material lessening of the breadth of the excavation. As the headpiece is subjected to a transverse strain, the importance of this advantage is obvious. When the level is driven by machine labor the sides are vertical, and hence the stanchions will, in such a case, be placed vertically.

Sometimes the floor of the excavation as well as the sides and the roof is weak. This happens when the rock of the floor is of a soft nature. Where a soft floor has to be dealt with two points present themselves for consideration. One is the difficulty of obtaining a support for the stanchions upon such easily yielding rock and the other is the tendency of the floor to rise in the middle in consequence of the pressure on the sides. Some instances of these were recently given to the readers of the PRESS. This tendency is very marked in many of the under clays of the coal seams and it necessitates the adoption of means for its prevention, as otherwise the destruction of roadways goes on continuously. This means is found in completing the framing of the timbering by placing beneath the stanchions a piece similar to the cap above them. When the floor is only slightly weak these pieces may consist of half-round timber placed with the flat side downward; but if the tendency to rise is great whole timber must be employed. The upper surface is slightly cut down and, in some cases, notched with an ax to receive the lower ends of the stanchions. Slabs or planks will sometimes be required beneath these pieces, placed in the same manner as those above the caps, for the purpose of keeping the floor down.

RENO needs reduction works very much. There are hundreds of base metal mines around in the vicinity, but if the prospector finds one it is an elephant on his hands, solely because of the inability to have the ore reduced at any reasonable figure. Once assured that their ore could have a market, in less than two years hundreds of new mines would be worked.

TAYLOR district, Nevada, is just now attracting much attention. A town has been laid out, and some of the vacant buildings in Ward are being taken down and removed there.

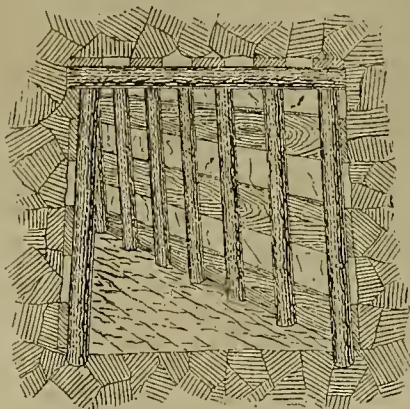
THE new smelter at Battle Mountain, Nev., will be in running order in a very short time, and those owning mines close to town have begun shipping ore to be smelted.

MORE prospecting is being done now than at any other time in the history of Eureka district.

Silver Shoes and Dies.

We made brief reference a few weeks since, to the invention by Messrs. Johnson & Osborn, of Dos Cabezas, Arizona, of a new style of shoes and dies for amalga-

gamating pans, formed of silver. The silver amalgamates readily and presents a surface having a strong affinity for any particles of gold, silver or mercury, and will arrest the latter even when in its most difficult condition to save when it is finely divided or "floured." The

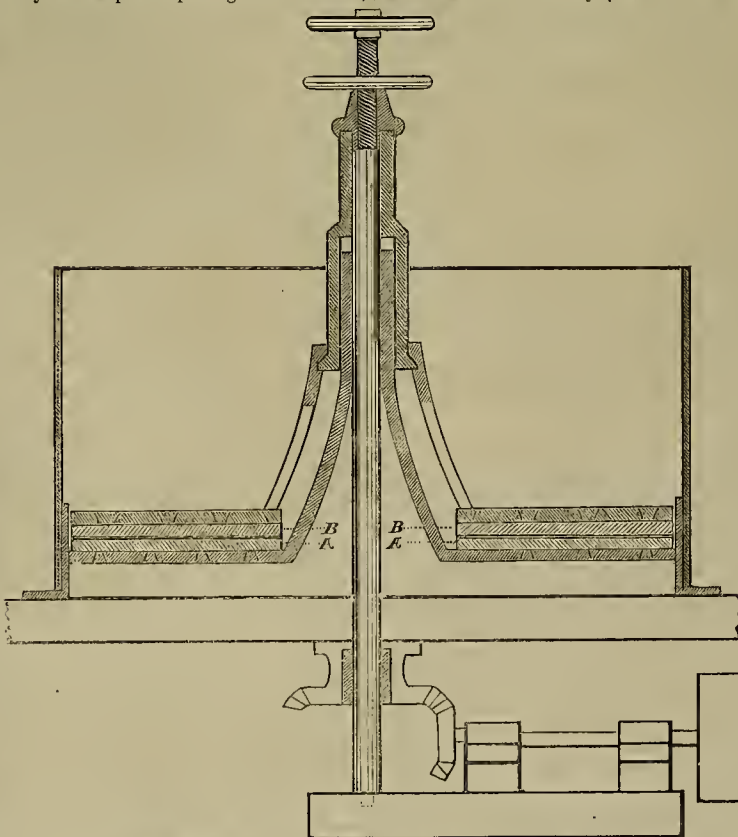


TIMBERING IN DRIFTS.

mating pans, and give now an engraving illustrating the application. The ordinary iron shoes and dies are subjected to considerable wear by the sharp sand passing between them,

shoes are represented at B, and the dies at A in the engraving.

In some cases the shoes are in the form of rollers which rotate as they pass over the dies,



SILVER SHOES AND DIES IN AMALGAMATING PANS.

and more or less iron is taken up with the amalgam, which is thus rendered base; and it is difficult to separate the gold and silver contained in it. The iron has, of course, no particular affinity for the particles of gold, silver or amalgam, and is of no assistance in arresting them.

Messrs. Johnson & Osborn propose as a new article of manufacture, shoes and dies for amal-

gamating pans, and the pulp is caused to pass between the surface of the rollers and the die, the great affinity of the amalgamated silver causing it to take up the passing valuable particles with great avidity. In this case the inventors think there is little need of the scouring or grinding action of flat shoes and dies. These shoes and dies may be used in what are known as "continuous pans" in which the pulp is fed in at the center

and is discharged continuously at the periphery of the pan. These silver shoes and dies add to the amount of silver by their wear, so absolutely nothing is lost, and there is no additional expense created to separate out base bullion afterwards. These shoes and dies form a new article of manufacture and may be practically applied quite readily.

The Lower California Placers.

The nature of the reports from the newly discovered placers of Lower California, is not such as would encourage men to leave their present work for the arid region in question. When this excitement first began, the PRESS stated that it was not likely to lead to anything but disappointment, since even if good placers are found, there is no water for the miners to work with. The gold mines that have been found in Lower California in time past have amounted to little on this account. When men have to pay fifteen cents a gallon for water to drink at the mines it follows there is not much use trying to work placer ground, and when this obstacle is added to that of great distance from civilized places, it is unlikely that the mines will amount to anything.

The men who have returned bring back very unfavorable reports of the mines and the regions, as the following, dispatch dated Guaymas, June 10th, shows: "The Joyce and Cashman party arrived to-day, after a hard trip to the placers. It took four days to cross the Gulf on our trip out, the distance being 111 miles to Trinidad Bay. Thence we went to the placers on foot, the distance being ninety-five miles, through a country devoid of vegetation and over a rough trail where water was very scarce. Nellie Cashman, with a party of five men, started from Trinidad Bay ahead of the rest of the party. Nellie and two of her party came near dying of thirst, but were rescued by the rest of the party overtaking them the second day out. When we arrived at the placers we found what there was of them completely worked out, Mexicans and Indians having worked them at least for one year. I saw over one hundred batches worked without a color. The placers are twelve miles from the nearest water, which is of inferior quality and which the Indians pack in and sell for 15 cents per gallon. From all appearances, inside of one month there will be no water nearer than the Mission San Gertrude, twenty-seven miles from the mines. We paid \$16 passage for ourselves and the same for our burros to cross the Gulf."

"SHEEP MOUNTAIN" is the name of a new mineral section in Idaho which is attracting many miners from Oda, Boise, Custer and Alturas counties. It is stated that the mines so far discovered give great promise for large returns over working expenses, though the country is yet comparatively isolated. The nearest route to Hailey is up Wood river to the head of Salmon river, and down the Salmon to the Middle fork. The mines were about 100 miles north of Hailey, or forty miles beyond Stanley basin.

THE *Southwest Sentinel*, New Mexico, says: Nearly the entire distance between Silver City and the new strike is covered with locations, and prospectors are in the field fifty miles beyond. The whole country is being scoured, and reports of finds are constantly coming in.

California Then and Now.*

After passing over a few miles of smooth, rolling hills clad with wild oak, alfileria, clover and mustard, our party of hunters descended into the fair valley of San Margarita, part of the princely estate of Don Juan Forster, and in a short time they reached the ranch-house itself.

The place is a relic of that golden age of California life which lay between the decline of the Missions and the invasion of the Yankee. Here still stands the old ranch-house, a great quadrangle of adobe, built around a courtyard, the seat of a little empire of 30 square leagues of land, much of it the very best in Southern California. The great walls, nearly a yard thick, hint strongly of cool days in summer and warm nights in winter. The long massive beams, cut in the mountains 30 miles away; the rafters lashed with raw-hide instead of being nailed; the old red tiles made by the Mission Indians and held in place by their own weight—all speak of the difficulties of building in those days. Yet the whole is massive and strong, and will stand for many a year to come when far more costly structures are decayed. Here still, as in bygone days, may be heard the whizz of the riata thrown by the skillful hand, for there yet linger a very few of that most extinct race, the old vaqueros of California—men who could, single-handed, ride down, lasso and bind the wild bulls of the hills on a mountain side, where a city rider would hardly dare to lead a horse.

Rude was their system of justice; but they had no probate courts or public administrators. They had no doctors or lawyers; but then they died without expensive assistance, and their families got at least 1% of the property they left. Living in true patriarchal style, surrounded by plenty of the solid necessities of life, with plenty of servants that cost only their board, with nothing to do but look after their herds, roll cigarettes, attend fandangoes and *meriendas*, and warble their beautiful language, they drifted down the stream of time without touching oar or rudder, or striking sand-bars or snags. That soft Arcadian day is gone. Its twilight still lingers in a few places, but its sun has set forever. Our countrymen came and were welcomed, for, contrary to the common belief, the majority of Californians were anxious for the change. We came with our usual Yankee conceit, and our prejudice against everything that comported not with our notions of "progress"—all strengthened by the prejudice against Mexicans imbibed during the war with them. We came to load them with ruinous costs and atrocious lawyers' fees to maintain those vested rights of property which all nations respect, to squat on their ranches and live on their cattle; to pass laws to destroy their only industry, and as time had proved, the best industry of this southern country. We came to lend them money at five per cent a month, and trap them into contracts to pay it for a long enough time to sweep away their homes with the mortgage. We came to turn up the parvenu proboscis at Indian-bred and Castilian-bred alike, and treated as "greasers" some who were our equals in every respect, and the superiors of many of the upstart Americans who sneered at them.

I do not believe that justice has ever been done to the Spanish of California, and this is not the only place to do it, even if I were fully qualified for this task. But such ideas as are generally obtained from newspapers and magazine articles about Texas and New Mexico convey a very false idea of the Spanish of California. Their names were written high upon the roll of honor of the State; and they have been among the best and most honest of State and county officials, and the most incorruptible and impartial judges. No more law abiding or better citizens existed than the upper half of the Spanish, and it is difficult to see wherein the lower half are any worse than the lower half of American society. If they are, it is only because they have bettered the instruction of excellent and faithful teachers. Their laziness, so much talked about, is precisely what that of the Western farmer would be if overwhelmed by a horde of Chinese, who should pass laws that virtually compelled him to abandon his way of making money and adopt theirs, of which he knew nothing, and which would barely make him a living. If their possessions are gradually slipping from them and their lands passing into the stranger's hands, it is due to the laws and the heavy taxes we have forced upon them, much more than to either their own improvidence or want of thrift. And when more than half the Americans are going the same road, we might as well acknowledge that we do not know all about the best way to make a living in southern California, and that the old inhabitants did know at least something of that art; for it is certain they were nearly all wealthy and wanted nothing.

After their visit to the old Mission our friends were glad to sit down under Don Juan Forster's great front porch and look down the valley toward the sea, just as the flood tide of rosy mist began to flow in from the sinking sun, and the soft carpet of the high, smooth hills to run through all shades of purple, green and gold. The waves of light ran rippling over the rolling slopes of silvery-green wild oats; the emerald meadow in front was dotted with horses and cattle; the wild geese and brant in

clamorous mobs were marching in from the coast; the wild ducks in whizzing flocks scudded up and down the valley; here and there a snipe was pitching and squeaking aloft; the sandhill cranes, with dolorous "gr-r-rooo, gr-r-rooo," were floating across the blue zenith; the white pelican, the egret, or the swan, was winging its solemn way toward the laguna, and from the canyon came the clear "ohio, ohio," of the valley quail.

"It seems like an enchanted land, does it not?" said Laura. "I don't wonder so many people fall in love with California."

"You are now seeing it at its best. There are times when it is different from this," said Dona Juan, with a frankness that is too rare among the Californians, when any question about California comes up. "We experience here three kinds of winter. First, the 'good' winter, when there is just about rain enough, and that properly distributed; then vegetation is at its climax, crops are good and the sloughs and ponds have plenty of water, and geese and ducks, as well as other game, are plenty. Second, the 'medium' year, when there is not rain enough (or not properly distributed), to make much more than half a crop of grass and grain, but when there is still enough to feed all stock and cover most of the expenses of the settler. The first of these may be too wet for the very sick invalid, the second will be about right, and there is a third will suit him exactly, if he wants only clear, warm weather, and has no sympathy for a suffering land.

"But who with a sentient soul can behold the 'dry' or 'bad' winter and not feel sorrowful? Day after day and week after week the sun climbs the unclouded sky, sinks into his ocean bed of silver, carmine and gold, and flames next morning at the eastern gate with as smiling a face as that of a just-accepted lover. At long intervals, as if in mockery of our hopes, a very few raindrops patter on the roof. And once or twice there may be enough of a shower to tempt one to borrow an umbrella, but not long enough to make him yield to the temptation to keep it.

But January treads on the heels of February, and February joins March in the long procession of bright days, with a smiling face above, and sad and sickening faces below. Then yonder rolling hills of velvet green are brown and bare; the violets and the alfileria, called out by the first good rain, sprout, curl up and wither away, or seed out at an inch high; the earth yields no interest on the farmer's loan; the bee returns empty to his hive; the quail declines to mate; the hare retires like a monk to the cloisters of the rocks; and the goose returns disgusted to the north. The ewe deserts her new-born lamb, and the raven begins to feed on her before she lies down to die. The ox or the horse staggers to the spring and is unable to return; bloated and weary, the overworked buzzard sits around on the corral fence; and still nature keeps up her steady dress-parade of fine weather, and the sun smiles on, smiles on, as bright and soft as if bound on an errand of mercy instead of an errand of death."

As he finished this doleful description, Don Juan shrugged his shoulder, with a gesture of resignation; and then, recovering his wonted demeanor, he arose, and with a smile excused himself, to provide for the entertainment of his guests within.

"Many people are very much disappointed with California, and do not like it," said Belville, after his host's departure. "It has been so abundantly overpraised by some writers who, not content with dipping their quills into the rainbow, must tear up the whole brilliant arch by the roots and splash it over their pages, that thousands have come here hoping to enjoy the felicities of heaven without the preliminary of dying. And nobody who has taken his ideas from these hyper-diabolical books—hyperbolic I mean, but it's all the same in this case—can feel anything but a bitter disappointment when he comes to California. All this has produced a reaction, until it is now the fashion to be quite as unjust on the other side."

MUSIC AMONG MINERS.—"As I passed down Main street, I was attracted by a crowd of men standing in front of the tansorial saloon. They were listening to music and song coming from within—a guitar and accordion. The air played and song sung were very good, but soon a critic among the crowd arose and said: 'I can improve that by going home after my fiddle,' and off he went. A second, hearing the remark, said: 'By Jove! I will get my fute.' Another got his banjo, and another said: 'I will bring the snaredrum and triangle,' and in less than half an hour six musicians were on the ground. In ten minutes I was listening to a complete philharmonic band of good musicians performing together on their various instruments as one man. Is it not surprising what an amount of talent is hidden beneath the garments of our Pacific coast workmen?" This pleasant little incident took place in Tybo, so small a mining camp that the outside world hardly knows that it has an existence. The *Eureka Sentinel* agent there, C. B. Streibberger, reported it for the *Belmont Courier*.

CONCENTRATORS.—Before the introduction of the Frue concentrators in this district, only about forty per cent of the assay value of quartz could be obtained. Now rock yields fifty and sixty per cent by the Frue. There ought to be a fortune in the tailings that are being sent down to the lower country, if some process could be found that would work them up to eighty or ninety per cent.—*Nevada Transcript*.

Settling Tanks in Silver Mills.

The following "Notes on Settling Tanks in Silver Mills" were submitted at a recent meeting of the American Institute of Mining Engineers, by Albert Williams, of the United States Geological Society:

A large proportion of the work performed in wet-crushing silver mills is devoted to the handling and re-handling of pulp between the battery and the pans. There seems to be no generally applicable substitute for the settling-tanks, and in the present system of constructing mills the tanks involve an amount of labor which may be regarded as disproportionate and unnecessary, in view of the automatic improvements which have been introduced in other directions.

This difficulty has been met, however, by Boss's continuous process, in which the pulp flows directly from the mortars to the first of a series of constantly working overflow-pans. This method has been adopted at the Noondy mill, Bodie, California; the Harshaw, Arizona; the Sierra Grande, New Mexico; and the Prietas, Sonora. The continuous process, while giving excellent results with special ores, and under peculiar local conditions (such as a deficiency in water supply), is not, I believe, claimed to be available for all raw amalgamating mills, notwithstanding its well merited popularity for certain work. Some trouble has been experienced from the tendency to concentration in the pans, though this can be avoided by skillful manipulation. It has also the disadvantage inherent in combinations of distinct operations; it requires a very nice adjustment of the water supply to obtain full battery efficiency without running the pans too thin, though the latter defect is partially compensated for by the gradual thickening of the pulp as it proceeds through the series of pans. The objection is similar to that which holds in a parallel duplex process, that of combining roasting and smelting in a single furnace, where each operation is injuriously affected by the necessity of fitting it in with another and entirely different one.

In the prevailing type of wet-crushing silver mills, the battery sands, after settling, are manipulated in one of the three following ways: They are either shovelled into wheelbarrows or cars, and thus conveyed to the pans, or they are dumped in heaps upon the platform immediately back of the pans, from which they are again spaded into the pans; or, if taken from the row of tanks nearest the pans, they are sometimes thrown directly from the tanks into the latter by a single handling. Each of these methods may be applicable in a single mill, according to the arrangement of the tanks relatively to the pans. All involve hard work and the employment of many men. Thus of the force employed in six Comstock mills (the Brunswick, California, Mariposa, Morgan, Scorpion and Trench), which in 1880 numbered 215 men, no less than forty-nine were tankmen; and of the crews of two mills in Owyhee county, Idaho (the Ellmore and Jones & Adams), six were tankmen in a total of nineteen. The wages were \$4 per shift of ten and twelve hours. These eight examples show that twenty-four per cent of the labor in the mills named consisted in handling the tank pulp. The instances cited include all the data I have at command, and probably show a fair average of the practice in mills of the same type. Remembering the notable saving which has been effected in other details of modern amalgamating mills it appears that here is a possible opening for improvement.

The object of this paper is to throw out a hint which may invite discussion, and may suggest to the builders of the mills of the future a remedy for the existing clumsy, slow and expensive mode of handling tank pulp. Instead of the laborious shovelling of the heavy, tenacious pulp to higher levels from the tanks, why not utilize the always obliging force of gravitation? This is already done in passing the ore from the bins successfully through grizzlies, rock-breakers and ore feeders to the stamps, and in settling the pulp; and after leaving the pans the pulp flows downward to the settlers, and thence to the agitators and sluices. In all these stages the movement is steadily downward, and is effected by gravity. It is only when the settling tanks are reached that an interruption occurs. Suppose now, that instead of the ordinary tanks we introduce a series of hopper-shaped boxes provided with gates at the bottom, placing the pans six to eight feet below the usual level, and discharging the settling boxes into movable troughs leading to the charging holes of the pans. The position of these self-dumping tanks would be the same as that of the ordinary ones; the grade of sluices from the battery to the tanks would not be changed; and the arrangement of overflow gates would be identical. The tank capacity could also be kept the same while diminishing the area, for the capacity of the common tank is determined by the limit of depth from which a man can conveniently shovel—this depth ranging in present mills from twenty-four to forty inches, and seldom exceeding 30 inches. The proposed system would allow the compartments to be smaller in area because of their correspondingly greater depth. The gates at the bottom of the tanks could be actuated by levers extending above the pan floor. Perhaps the best arrangement would be to employ hinged bottoms surfaced with burlap, sheet-rubber, or

other packing. Any slight leakage would not be objectionable; for the water would be strained as it escaped, and all drippings would collect in a large fixed trough underneath the tanks, from which the water could be conducted to the slime ponds or used in diluting the pan and settler charges. The details of construction can be elaborated by any mill designer.

The plan of using gravity-discharging tanks is, I admit, open to certain objections. It demands steeper grades inside the mill, to allow room for a half floor beneath the tanks, and to give sufficient fall for the sluices from tanks to pans. The work of excavation for foundations would be increased, and the mortar beds would need somewhat heavier backing. On the other hand, the area occupied by the building could be slightly reduced. The expense would depend largely upon the natural grade of the site. For a twenty-stamp mill the addition to the first cost (given a favorable site) should not exceed \$1,000—an amount which could be saved in wages of tankmen in a three months' run.

Colorado Ores in Utah.

In the Montrose (Col.) *Messenger* of the 17th, we find the following: Mr. Knapp and Mr. Ferguson, two prominent smelting men of Salt Lake, were in Montrose Sunday morning on their return from Ouray. They had been investigating the chances for securing San Juan ore, for reduction in Utah, and have purchased several carloads to be used as a test. This is a step that is in the right direction for us. The smelters of Utah have been successful. Labor is cheap there, and the cost of reduction is, of course, low, and should these gentlemen succeed with their experiment, as they undoubtedly will, a splendid market will be opened up for our ores. Montrose being about midway between Denver and Salt Lake, we see no good reason why the Denver and Rio Grande road should not carry ore from here to Salt Lake for the same price it is now hauled to Denver for. If this is done, when the wagon road is completed from Ouray to Red Mountain, the ores of that famous camp can be shipped to Salt Lake for less money than to Denver by way of Silverton. Then if the Utah smelters can reduce the ores at a saving on Denver prices, all the ore of Red Mountain and the rich camps of Ouray and the San Miguel will find its market in Mormonland.

It may be urged that the Rio Grande interests in Colorado are such that they would prefer to work for Denver and Pueblo business as against Salt Lake, and consequently they may not give the latter place the same advantage on rates. We cannot see it in that light however. With 700 miles haul from Denver, and about 600 from Pueblo, to Salt Lake, on through traffic, it is much more to the interest of the narrow gauge to build up a great metropolis in Utah, than to help build up the Colorado smelting points. By building up a rich, prosperous and populous territory west of us, that company can look for an immense through traffic over their line.

Another item in favor of Salt Lake, is the fact that their coke comes from Colorado. The D. & R. G. would therefore have the hauling from Crested Buttes, a distance of nearly 500 miles, the very coke that would be used in reducing our ores after they reach the Salt Lake smelters. All this would tend very materially to increase the company's traffic, and we contend that by giving the western smelters good rates on San Juan ore, the railroad company will be pursuing a policy that can but result in building up an immense traffic for the road. Should the recent visit of Messrs. Knapp and Ferguson result in opening up a market in Utah for San Juan ore it will be a great thing for Southwestern Colorado.

NEW MILL AND NEW CONCENTRATOR.—Turnham & Co.'s new mill, at the North Bauer Tunnel mine, works very satisfactorily. Five stamps are kept busy upon a good quality of ore, and as soon as everything is ready the other five stamps will be started up. A Golden Gate sulphurets concentrator is being put in by G. W. Waitt, of Boston, who is on this coast for the purpose of introducing the machine, which is of recent invention, and which, it is claimed, will perform twice as much work as those of the Frue patent. The machine costs twice as much as the latter. This is the first one to be put up in this section, and the agent guarantees that if it fails to do as represented the owners of the mill need not purchase it. Should the working of the new concentrator prove unsatisfactory, Mr. Waitt will bear the expense of putting it up. The machinery at the above mill is driven by a Pelton wheel.—*Nevada Herald*.

THE AUBURN MINE.—It is reported that the Auburn mill and mine, at Dun Glenn, suspended operations yesterday. It is to be hoped that such is not the case, yet from what miners have been saying about the Auburn for a year or more, we fear the report is too true.—*Silver State*.

REPORTED BIG STRIKE.—By passengers on last night's train the report is brought that a very large chamber of exceedingly rich ore has been struck in the Christie Company's mine at Mineral Hill. No definite particulars could be had, but the story is that the find is of great importance.—*Eureka Sentinel*.

* From the "Rifle, Rod and Gun in California," by T. S. Van Dyke.

MECHANICAL PROGRESS.

A New Mode of Wire Manufacture.

A French invention for wire manufacture is described at length in a communication received from English patent solicitors. The present method of manufacture requires repeated passage of the metal first through the rolls for the purpose of reducing the ingot, and then through draw plates in order to further reduce the wire to the required diameter. The invention in question has for its object an improved arrangement of rotating ingot mold, whereby it is rendered possible to run out the metal directly in the form of wire of the required diameter or nearly so. This apparatus is composed of a vertical shaft supported at its lower extremity in a footstep bearing. The shaft carries a cast iron plate, provided at its outer edge with an annular channel, which is closed in or covered by a ring or annular cover forming the mold proper. For this purpose the ring is provided with a groove of suitable form for the reception of a molten metal, which is contained in a pocket or ladle, supported by an iron ring swivelling on trunnions or centres, and carrying a rod or arm, to the upper extremity of which is attached a cord, connected to and capable of being wound upon a pulley or drum on the vertical shaft. The lower part of this shaft is provided with a bevel wheel, geared with a corresponding wheel on a horizontal shaft, provided with fast and loose driving pulleys. The annular channel is supplied with water by a pipe, this water passes through a stop-cock, traverses footstep bearing, and is conducted along the centre of the vertical shaft, whence it flows through a radial pipe to the channel. The water escapes from the channel through another radial pipe, descends in the center of the hollow vertical shaft, and is discharged through channels formed in the footstep bearing, into a pipe provided for its reception. The metal run into the mold or annular groove is cooled by the circulation of the water and solidifies. The wire thus produced is lifted by a finger or point, and conducted away from the mold. The rotation of the shaft causes the cord attached to the arm on the ring supporting the ladle, to be wound upon the drum or pulley, thus tilting the ladle and causing it to deliver the molten metal in a regular and constant stream. The periphery of the drum or pulley is made of special form, determined by experience, with a view of causing the metal to flow with regularity. The framework of the apparatus is made of cast iron, and is provided with a trough or gutter for the reception of the water in case of leakage. The wire obtained by means of this apparatus requires to be passed once or twice through a draw plate. By suitably modifying the form of the revolving mold, the wires may be made with enlargements, swelling or other appendages of any suitable material.

Floors Weakened by Gas Pipes.

A short article in the *Building and Engineering Times*, on the subject of weakened floors, deals very intelligently with the harm that may be done in this direction by careless gas fitters. It is common enough, in cases where a pipe has to be led under flooring and across joists to serve a pendant, for the pipe to be taken straight across the center of the room, and the joists notched about an inch deep all the way. Workmen who do this never reflect on the harm they are doing to the floor, nor do they know that a notch cut out of the top of a joist will seriously weaken it. This at once becomes evident when it is known that the strength of a joist, which is a rectangular beam, is proportional to the depth squared. If, therefore, a groove one inch deep is cut across a seven-inch deal, the reduction of strength is not only one-seventh, but a great deal more, in the proportion of thirty-six to forty-nine, or a loss of rather more than one-quarter of the original strength of the beam. This somewhat startling result is due to the self-evident fact that the upper part of the joist is required to be solid, in order to resist compression, just as much as the lower portion must be capable of bearing tension; and to cut a notch in the top of it is equivalent to removing the substance along the whole depth of the joist, to the full depth of the groove. This observation only applies to cases where the notch is cut out of the center of the span, which is the common practice. There is much less objection to cutting joists close to the end, and thus allowing the pipe to be laid round the room to a point where it can be run to the center between two joists. Or, if this course cannot be followed, the pipe may safely be passed through a hole bored in the middle of the joists. If this is not feasible, the indispensable notch may be cut right down to the middle of the joist, and the pipe thus laid across the neutral line; the space above being afterward filled with a tight wedge which will safely transmit the compressive stress.

THE VALUE OF INVENTIONS.—It is generally supposed that small inventions have no value. But if we enquire more closely into the history of some of the "trifles" that have been invented, very different conclusions are arrived

at. Thus, it is stated that the stylographic pen yields to the proprietor of the patent no less than £20,000 annually. The same revenue is said to be derived from a patent for a pen for shading in various colors. The inventor of the gummed newspaper cover is now a rich man. The screw points at the ends of lead pencils have made the owner of the patent independent. The Abyssinian well is said to have yielded to the original inventor, Colonel Green, no less than £600,000. The inventor of the roller-skates is reported to have acquired a fortune of £200,000. Even ordinary toys for instance, the returning ball, with India rubber coating, and several other amusements for children—have returned from £10,000 to £15,000. The toy called the "Crier" brought the inventor within nine months a sum of £30,000. Although these few instances by no means prove that all small inventions must yield such profits, it may, nevertheless, be said that many are lost to the inventor from want of energy and perseverance, while another person, who will take the matter up later, will make a fortune by them.

IMPROVEMENT IN HOT-AIR ENGINES.—The *Manufacturers' Gazette*, in speaking of hot-air engines, says: "In an improved form of hot-air engines now coming into use, the action is such as to overcome almost all the difficulties encountered under the ordinary system. After the fire is made, the retort becomes heated to a dull red heat, which rise of temperature expands the small amount of air inside the piston, being by this means forced in the air cylinder downward. After this expanded air has done duty, the displacer, which is actuated from a crank, forces the air which has been condensed against the cold sides of the top part of the cylinder back to the hot end of the retort. As the piston performs its stroke, due to the expanded air in the cylinder, a small air valve is kept closed by the pressure; but as the piston makes the return stroke, a small valve on the top of the cylinder opens for a sufficient length of time to permit air to enter the cylinder, to replace any which has escaped through defect in packing. It is therefore not only automatic in receiving the proper supply of air for expansion, but is also automatic in its lubrication, for whenever this down stroke is made, a small amount of oil is drawn into the cylinder for lubricating the metallic piston—a great advantage in hot-air engines."

MALLEABLE NICKEL.—Pure nickel, after melting and casting, generally holds a greater or less quantity of oxygen in solution, and the metal is brittle. To hinder the injurious effects of the oxygen, it is necessary to incorporate in the melted nickel some substance which has a strong affinity for oxygen and also for the nickel itself. J. Garnier finds that phosphorus serves both of these purposes very satisfactorily, producing effects analogous to those of carbon in iron. If the phosphorus does not exceed three tenths of one per cent the nickel is soft and very malleable; above this quantity the hardness increases at the expense of the malleability. Phosphorized nickel, when alloyed with copper, zinc or iron, gives results which are far superior to those that are obtained from the same nickel when not phosphorized. By means of the phosphorus, Garnier has been able to alloy nickel and iron in all proportions, and always to obtain soft and malleable products. The contradictions of illustrious chemists are thus explained, some saying that such alloys were brittle, others that they were malleable; the latter had alloyed the nickel to phosphorized iron.—*Comptes Rendus*.

ELECTRICITY AS A RAILWAY MOTOR.—Mr. Edison is said to claim that, by means of a central rail, electricity can be used as a motor on railways so as to effect a saving of thirty-three per cent in present cost of coal for steam locomotives. He admits, however, that electricity is not likely to be generally adopted for heavy freight trains or through passenger trains, but believes that electrical motors will be invaluable for street cars, elevated railways and other short lines. An example of their adaptation to these purposes will be seen on the elevated electrical railway at the railway exposition. At present it is admitted that electricity as a motive power is not as economical as steam for operating railways, but it is not impossible that in the future much greater economy may be introduced.

CAST IRON CHILLED TOOLS.—At a recent meeting of the Institution of Mechanical Engineers, in England, Mr. Fielding exhibited some cast iron chilled tools, and said that with chilled tools—the cost of which he showed to be merely nominal—he was able to turn cast and wrought iron and gun metal at from 50 to 100 per cent higher speed than with tools made from steel. He expressed surprise that such tools had not come into more general use.

DON'T OVERDRIVE YOUR MACHINERY.—The policy of driving our machinery is a losing one. When normal speed is on, and the machinery is running, all is well, but the moment the speed is increased beyond the natural bearing capacity, something must give way. It may not be at once, and the unnatural speeding may go on very well for a term, but the machine is wearing away faster than it should, and some of these days the man who runs it will be forcibly reminded of the old deacon's "one-hoss shay."

SCIENTIFIC PROGRESS.

Telpheage.

This new term is applied to a mode which has been devised by Prof. Fleeming Jenkin, of Edinburgh, for the transmission of vehicles containing goods to a distance, by means of an electric current, not connected with the vehicles themselves. The Professor's idea is to employ strained metal cables, which will serve both to sustain the load and convey the electric current. The frames or trucks supporting the load run along the cable on wheels, and the cars or loads are suspended below them from the axles of the wheels. In the simplest arrangement of the line there is a break of continuity at each post supporting it, and the sections of cable are themselves insulated from each other and the earth. They are, however, capable of being connected by movable coupling pieces, actuated by the train, so that all the sections receive the exciting current and form part of the general circuit. The current is supplied to the line by a stationary dynamo-electric machine, and since the line is elevated from the ground on insulating standards, the same dynamo will supply a considerable length of line, as the leakage need not be excessive if proper precautions are taken. Mr. Edison has adopted the plan of dividing the whole line into short sections of a few miles, with stations and feeding dynamos at each. Dr. Siemens favors the use of an insulated conductor supported beside the line, and giving current to the motor on the train by means of a running connection pulled by the train. Prof. Ayton and Perry have sought to overcome the leakage difficulty by making the line in very short sections, each of which is put in circuit with the dynamo in turn as the train progresses, by an automatic action of the train itself. In this way there is only one section electrified at a time—namely, that over which the train is running—and the leakage on the whole line is consequently very small.

The loads or cars on the telpheage line are connected together in trains, and the length of a train is nearly the length of a section of the cable or conductor. On passing either of the movable coupling pieces between two sections the train throws it out of action, disconnecting the two sections at that point, but the circuit between these sections is maintained through the wheels of the train itself and a conductor on the train. In circuit with this conductor is a dynamo-electric motor, which is actuated by the current, and propels the train by driving the wheels. The train is provided with a governor, which acts directly to check the train if the speed becomes excessive by short circuiting the electro-motor, or otherwise bringing electric brakes into operation. To further insure that one train shall not overtake another, Prof. Jenkin provides an automatic telegraphic communication along the line, and the trains, in passing, close and open the telegraphic circuits. It will be seen from the above description that the control of the trains is completely automatic and independent of the train officials.

New and Remarkable Chemical Experiments.

The liquefaction of oxygen gas and nitrogen, the freezing of alcohol and sulphide of carbon, are the latest achievements of chemical science. This news comes to us from the laboratory of M. Wroblewski, in Cracow, Poland, who has given some interesting particulars in a dispatch to M. Debray, published lately in *Comptes Rendus*. By the use of liquefied ethylene, M. Wroblewski and K. Olszewski obtained the remarkably low temperature of 136° C., equal to 212.8° F. Oxygen gas subjected to about this temperature, and compressed under a pressure of about 25 atmospheres or 375 pounds to the square inch, was readily liquefied in glass tubes, and formed a colorless and transparent liquid, very mobile, and resembling carbonic acid.

Nitrogen was also liquefied, forming a colorless liquid. Alcohol was solidified at 130.5° C., or 202.9° F., forming a white body. Sulphide of carbon froze at about 116° C., or 176.8° F.

These are certainly very interesting and remarkable experiments. Air contains by weight, approximately, 23 parts of oxygen and 77 parts nitrogen. It is common to compress it to a far greater degree than above mentioned. For motive power, in driving compressed air locomotives, a compression of the air to 1,000 pounds to the square inch is in some cases employed. The difficulty heretofore experienced in the liquefaction of oxygen and nitrogen has been to obtain a sufficiently low temperature in conjunction with compression. This obstacle now appears to be removed, and a variety of new and valuable observations concerning the nature of gaseous substances may be expected.

THE CHEMICAL EFFECT OF SUNLIGHT ON PLANTS.—Dr. Hermann Vogel, in his treatise on "The Chemistry of Light and Photography," points out the chemical effect of sunlight on plants, and especially the modified growth of plants owing to differences in the intensity of light, stating that these variations in the chemical intensity of light are very important to the life of plants. The green leaves of plants imbale carbonic acid and exhale oxygen under the influence of light, but this breathing process does

not take place in the dark. Without light, plants develop only sickly blossoms, like the well known white germs of potatoes kept in cellars. The necessity of light for the life of plants is also seen in the effort made by plants kept in darkened rooms to reach the apertures which admit light, growing, as it were, toward them. The plant, therefore, develops with an energy proportioned to the intensity of the light, and the greater fruitfulness of the tropics is to be ascribed not only to the higher temperature, but also to the greater chemical intensity of the sunlight. Recent observations have established that the red and yellow rays, and not the blue and violet, produce the greatest chemical effect on the leaves of plants.

HYDRAULIC SILICA.—If a solution of potassium or sodium silicate (water glass) is decomposed by an acid, gelatinous silicic acid separates. If this be dried at a red heat, and the operation repeated until the alkaline salts are entirely removed, a pure silicic oxide (silica) is obtained that is insoluble in acids. Landrin says it is the source of the real hardening of hydraulic mortar.

In certain cases the aluminate of lime is a help to the setting of the cement, somewhat as gypsum would be, for, notwithstanding its slow solubility, it renders the combination of the hydraulic substances easier at the first immersion and prevents the rapid entrance of water into the mass of the mortar, which is favorable to the slow and gradual union of the lime with the hydraulic silica. It is a fact, for instance, that the lime from Theil, which contains none of the aluminate, cannot be used for hydraulic constructions in the ocean, because it crumbles before it sets, while it is proved very valuable for use in the Mediterranean sea.—*Compt. Rend.*

VEGETABLE PARASITISM IN FISHES appears, from recent observations made by Messrs. Olivier and Richet, to be so constant that it may be regarded as normal. These gentlemen examined about 150 fishes taken in the Channel and the Mediterranean, and in all of them they found in the peritoneal liquid, in the lymph, in the blood, and so in all the tissues, microbes more or less numerous, having all the characters of land microbes, and being capable of similar reproduction. These organisms were mostly the bacterium called *Bacillus*. The authors cultivated these microbes successfully. They also repeatedly made an experiment which consisted in putting a whole fish or part of it in paraffine melted at 120° or 140°. After solidification, the paraffine was coated with several layers of collodion and Canada balsam. The tissues thus guarded from atmospheric germs all showed, after a few weeks, an extreme development of microbes which were not those of putrefaction. The authors propose to investigate the mode of penetration of these parasites and their influence on the vital functions.

THE TRANSMISSION OF SOUND THROUGH ROCK.—Some very interesting observations have been made in the course of mining work in the Hartz mountains, Germany, on the distance through which sounds are transmitted in rock; the latest facts relating to the subject being recorded by Herr F. Schell, of Grund. In a horizontal direction, the firing of shots at the face of a cross-cut has been heard in a cross-cut driven toward it, the face of which was 447 feet distant from it. Until recently, however, no occasion has presented itself to observe how far sound was transmitted in a vertical direction. A level was driven on a vein at a depth of 538 feet below the surface, and happened to strike 187 feet distant, in a horizontal direction, below the stamp mill dropping stamps weighing 300 pounds. The dropping of the stamps on the surface could be distinctly heard in the heading below, which in a direct line, the hypothenuse of a right angle triangle, was separated by 471 feet of rock.

SELENIUM AS A REGULATOR OF HEAT.—According to the *Comptes Rendus*, Mr. P. Germain proposes to use the various degrees of resistance which selenium opposes to the passage of electricity at different temperatures and under different rays of the spectrum, to the regulation of the temperature in muffle for enameling painted glass or porcelain. He uses a thermo-electric battery of thirty elements, which receives the heat directly from the muffle. The opposite pole is connected with the wall of a porous vessel, full of water, which maintains a sensibly constant temperature. The thermo-electric current increases in potential proportionally to the elevation of temperature in the muffle. The selenium which is brought into circuit remains comparatively unaffected until the muffle has reached the proper luminous temperature, when it allows the current to pass and to give a signal by means of a bell.

WILL GAS PASS THROUGH STONE?—Prof. Doremus has shown this to be the case in some experiments made not long ago. A block of brown sand stone, twelve by fifteen inches long and four or five inches thick was used. A pipe was clamped on to the stone by means of iron plates, and this pipe connected by means of flexible tubes with the gas pipes. The remainder of the stone was painted over several thicknesses with varnish. Opposite to the point where the gas was applied there was another pipe for the gas to escape from. In a few moments a lighted paper applied to it caused a flame to appear, showing that the gas had passed through the stone.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

BUNKER HILL.—Anador *Leader*, June 9: The second clean-up at the Bunker Hill mill since the resumption of work was made Wednesday of last week. The run was for about 25 days with 10 stamps, and the yield was about \$5,000 in bullion, besides sulphurets, valued at \$1,000. This is considered a very satisfactory result. The employees were paid off last Tuesday, and the second installment on the back indebtedness was paid promptly according to agreement.

MISCELLANEOUS.—The clean-up of Hadley & Vair's gravel claim at Bunker Hill about a fortnight

MISCELLANEOUS.—The clean-up of Hadley & Vair's gravel claim at Posey Hill above Volcano was finished last Friday, and resulted in enriching the lucky owners to the tune of \$6,000—a big yield. The Kelly mill is cleaning up on Morgan's rock, with prospects of a good yield.

FROM SUTTER CREEK.—Cor. Amador Ledger, June 9: The Amador canal is still giving trouble. Two breaks have occurred since my last writing, which involved considerable time and expense to repair.

ANOTHER SUIT COMMENCED.—Another suit has been commenced over the Mammoth mine. This time Mr. Fenton is the plaintiff. He did some work on the claim 17 or 18 years ago. The suit has been started in the United States Court in San Francisco, and the demand is for 600 feet of the north end of the claim, which includes the bonanza. The complaint alleges fraud in the securing of the patent. That is always the way. When a man strikes a good thing, no matter how straight-forward and honorably he acted in obtaining possession and title, half a dozen claimants rise up and conjure up some ground for litigation and worryment. The new suit will not be likely to interfere with the prosecution of work.

COAL.—*Amador Dispatch*, June 9: We were shown a large chunk of fine looking coal the other day, taken from the mine, near Lancha Plana, owned by Messrs. Murray and Waddell. It appears to be greatly superior in quality to the lone coal, and can be worked to advantage as soon as the means of transportation becomes more convenient. The vein is about seven feet in thickness.

Calaveras.

From Mr. McNevin's—*Cor. Min. Echo*, June 9; Halted a mile west of town the little one-stamper, of great capacity, lifts and drops its mighty arm night and day, with the precision of clockwork. A visit to this little mill is sure to please one. Its simpleness is the one great feature, and one is convinced that its 130 drops a minute will do the work that is claimed for it. The ore from the mine—O. K.—on which it is running, is of good quality, and the mine looking finely. Messrs. Knowlton, Soublett & Co., have a good property, and are deserving of it. A few miles north of town, on the Washington, all is activity. The carpenters are busily engaged in erecting a fine residence for the Sup't. Mr. McNevin, and other necessary buildings will follow in quick succession. Work has been retarded somewhat on account of the difficulty of getting lumber on the ground. The new shaft is being driven with all the speed that experienced miners can accomplish in eight hours.

Mining Share Market.

Mining stocks have not acted very encouragingly to dealers this week, as our tables show. The Comstock have not held up, as was expected, notwithstanding no less an authority than Mr. Flood speaks favorably of the situation there. He believes the Comstock is to-day the best place in the world in which to find a mine. He has not lost control of the north end mines, neither does he intend to. He says there is nothing to fear from the water. Mr. Flood expects Mackay home in a few weeks, when he and Mackay will visit Virginia together and make a thorough inspection of the mines. He regards the present situation as very hopeful, and says deep mining is no obstacle to success, though its pursuit requires courage, and economy will have to be practiced in order to produce the best results. Mr. Flood is considering the practicability of introducing the electric light into the mines. The Satro tunnel, he says, is the salvation of the Comstock. He thinks Mr. Fair either misrepresented, or that he was laboring under some kind of hallucination, when he said what he did about the Comstock in New York.

The following are the financial balances of the various mining companies on June 1st: Cash on hand Alta, \$28,875.00; Albion Con., \$54.93; Ar-genta, \$3,519.58; Belcher, \$26,750.36; Benton Con., \$6,488.66; Bechtel, \$241.96; Bodie Con., \$41,334.99; Bulwer, \$12,229.97; California, \$14,809.93; Con. Virginia, \$35,074.34; Chollar, \$38,984.12; Crown Point, \$21,161.27; Challenge Con., \$5,160.23; Con. Imperial, \$2,276.87; Day, \$5,159.83; Gould and Curry, \$12,349.04; Hale and Norcross, \$17,087.61; Jackson, \$2,279.87; Lady Washington, \$5.83; Mono, \$3,044.85; Mexican, \$31,357.64; Northern Belle, \$93,740.65; Ophir, \$25,960.73; Occidental, \$6,629.00; Potosi, \$4,873.05; Scorpion, \$6,231.57; Savage, \$22,735.33; Standard, \$98,754.72; Sierra Nevada, \$59,104.60; Silver Hill, \$2,547.14; Utah, \$750.50. Indebtedness Best and Belcher, \$7,802.41; Grand Prize, \$11,879.04; Utah, \$3,448.23.

WATER-GAS FUEL FOR STEAMSHIPS.—A test is about to be made in England of the use of water-gas as fuel for steamships. The Mauritius steamship line has built a steamship called the *Heron*, of 1,000 tons burden, and provided it with the apparatus invented by Dr. C. Holland for making water-gas. Dr. Holland's process has been tested on the Long Island and Erie railroads; but this is the first time that it, or any similar process, has been applied to a steamship. The *Heron* is to ply between London and the islands of Mauritius and Madagascar, and it is expected that she will start on her trial trip on May 10th. She has been fitted out with six furnaces precisely like those placed by Dr. Holland in the experimental locomotive named after him on the Erie road.

Isthmus Railroad.—Active work has been commenced on the Tehantepec railroad. The steel rails are already on the ground, together with six engines and a large number of cars. Senor Sanchez, President of the company, is now in the United States ostensibly to rest a while from his arduous labors, but in reality he has been commissioned by the Mexican government to negotiate a small loan for the purpose of completing the isthmus railroad. As this line belongs exclusively to the government, and prompt payment will be guaranteed, the necessary funds will, no doubt, be readily obtained in St. Louis or New York.

COAL.—*Amador Dispatch*, June 9: We were shown a large chunk of fine looking coal the other day, taken from the mine, near Lancha Plana, owned by Messrs. Murray and Waddell. It appears to be greatly superior in quality to the lone coal, and can be worked to advantage as soon as the means of transportation becomes more convenient. The vein is about seven feet in thickness.

Calaveras.
FROM MURPHY'S.—Cor. *Alt. Echo*, June 9: Half a mile west of town the little one-stamper, of great capacity, lifts and drops its mighty arm night and day, with the precision of clockwork. A visit to this little mill is sure to please one. Its simplicity is the one great feature, and one is convinced that its 130 drops a minute will do the work that is claimed for it. The ore from the mine—O. K.—on which it is running, is of good quality, and the mine looking finely. Messrs. Knowlton, Soublett & Co., have a good property, and they are deservng of it. A few miles north of town, on the Washington, all is activity. Carpenters are busily engaged in erecting a fine residence for the Sup't. Mr. McNevin, and other necessary buildings will follow in quick succession. Work has been retarded somewhat on account of the difficulty of getting lumber on the ground. The new shaft is being driven with all the speed that experienced miners can accomplish in eight hours.

El Dorado.—Georgetown *Gazette*, June 9. Should the new Enreka ledge continue to hold its present thickness in depth and retain its richness, it will be one of the best dividend paying mines in the State. The lode is more than 10 ft wide, and prospects well in free gold throughout, averaging, so far as we can judge, about \$10 per ton in free gold; but Mr. Cheek who is opening the lode, thinks it will average fully \$15. The quartz is now showing quite a per cent of fine looking sulphurets, which may be rich in gold for all we know.

Fresno.
A VALUABLE MINE.—*Fresno Republican*, June 9: The Albion mine, situated in Fine Gold mining district, is rapidly coming to the front as one of the most valuable mines in the county. On May 26th, \$1,214.10 was obtained from 11 tons of rock, or at the rate of over \$110 per ton. They are now working at a depth of 50 ft from the surface, the ledge widening and getting richer as they descend. They have abundance of water for hoisting purposes. Wm. Robertson and Jessie Morrow, of this city, are owners.

Mono.—TEMPORARILY CLOSED DUE TO.—*Bodie Free Press*, June 6: The Bodie Tunnel mill has closed down temporarily. Supt. Thomas Buckley states that of late the mill has been working low grade ore, and it is thought advisable to open up some rich veins known to exist west of the present workings. While this dead work is progressing the mill will remain closed.

Nevada. *To be worked.*—Nevada. *Transcript:* The American claim, owned by the Citizens Bank of this city, is situated on the south bank of Deer creek, four miles east of town. It embraces 120 acres, and is supposed to include the outlet of the rich Quaker hill channel, from which much gold has been taken at various places. The ground in the American location has never been worked at all as yet, but negotiations now pending are likely to result in it being opened up during the present season. It is favorably situated for hydraulicking, and perhaps can be drifted to advantage. The new ditch of the South Yuba Co. runs by it, and a fall of 300 ft could be obtained.

THE NORTH BANNER.—Nevada Transcript, June 9: Five stamps of the new 10-stamp mill at the North Banner Tunnel mine (Ternan & Co.'s) are now pounding away steadily on good ore, the machinery doing its work well. G. W. Waitt, from Boston, is putting into the mill a sulphuret concentrator called the Golden Gate, which is a very recent invention.

Placer.
A PENRYN MINE.—Placer *Argus*, June 6: The Chicago and Pacific M. and M. Co., is the full name and title of an incorporated company who are operating a mine one mile east of Penryn. The works

comprise a 200-ft shaft, with tunnels extending north and south from the 100-ft and 200-ft levels, together with hoisting apparatus and a 10-stamp quartz-mill worked by steam. At the 100-ft level the northern tunnel is 125-ft long, and the southern, 90-ft while at the bottom of the shaft both tunnels are 180 ft in length. Not much has been done lately, owing to certain improvements, such as the putting in of two Frue concentrators; but in a short time everything will be ready for a good start, and 20 to 25 men will be employed at the mine and mill. As present there are only six. We are informed that a good body of ore is in sight, and that the prospects for the early development of a first-class property are excellent. The company is made up chiefly of Chicago capitalists—whence doubtless the name. Francis W. Pike is the name of the new superintendent, and W. H. Oates is the foreman. The company run their own boarding-house.

Plumas.

COPPER.—Greenville *Bulletin*, June 6: During the past two or three years the Engle Brothers have been prospecting for copper on the mountain east of North Arm. Last year they found a ledge cropping out at an elevation of about 1,600 ft above the stream; on this they sunk 40 ft to test the vein, and the result being satisfactory they then started a tunnel that would cut it at an additional depth of 100 ft. This tunnel has now reached the ledge which is found to be of great width, probably 40 ft; the ore is estimated to contain as high as 40% of copper. On the surface the ledge crops out for a long distance. The father of the Engle Brothers is an old German miner, familiar with the copper mines at Germany; he is now with his sons and is confident that mines of great value can be found on this claim.

OPHIR CO.—This claim is east of the Indian Valley mine and contains two ledges, named respectively the Ophir and Primrose; these run parallel to each other, and are about 100 ft. apart. No. 1, Hall is the sole owner. North and south the claim is bounded by patented ground. In sinking a distance of only ten ft. in the Primrose the ledge opened out to over three times the initial width; prospects on the Ophir ledge are also very encouraging. Mr. Hall shows quartz taken from this ledge that is quite rich; it is not "spotted," but has the gold well distributed through the mass, and has such general characteristics as warrants the belief that there is a large body of it.

WOLF CREEK.—The ledge discovered by McIntyre and Deal is 25 ft wide; the ore is richer than any seen in that locality for a long time. An amicable arrangement has been made between all the parties concerned so that no vexatious delays will prevent the steady working of the mine. A greater activity than ever is among the probabilities for that place.

San Bernardino.
BEST.—*Cadco Print:* The ore body consists of two veins of black metal mixed with iron silver and red chlorides. These veins are about eight feet apart run parallel and dip at an angle of forty-five degrees to the southwest. The upper and most convenient one to follow has been stripped by an inclined shaft to the depth of 20 feet, where it changes its course and apparently goes straight down. This fact was noted with much satisfaction by the owners, who are fully persuaded that the two veins combine at no great depth, forming a lead from which ore can be extracted with great rapidity. Over five tons of ore, expected to work \$700 or \$800 per ton, have been taken out, and will soon be milled. Work will then be suspended during the heated term.

BISMARCK. This mine, like its neighbor, the Humburg, is astonishing all by the richness of its deposits. Mr. Godfrey reports another rich strike near the east line of the claim.

OCCIDENTAL. Messrs. G. N. Jackson, foreman of the Oriental mine, and Andy Hunter, have leased the western portion of this mine, next to the Humburg. Two men are at work taking out ore similar to that in the latter mine, and more men will be added as prospects justify.

HUMBURG. This phenomenal mine is still holding its own. There is 800 tons of ore on the dump, mined by four men in less than four days.

EXCHEQUER. This is decidedly a rich mine. The developments of the last few days have removed all doubts of its permanent value.

GRANITE DISTRICT. *Calico Print:* Several days ago, Messrs. Joiner & Morrow called at our office. They had just arrived from Granite district, where they have been prospecting for some time, and have taken up a dozen or more copper claims. They bring in some very flattering reports concerning the prospects of that camp. If one-half of what is supposed to exist there in the matter of copper is ever taken from the mines, it will be immense. We were shown

some fine specimens of copper containing a small percentage of galena, which assays fifty or sixty per cent of copper. There are a few ledges that are said to be forty or fifty feet in width, and many six feet in width. The specimens shown us came from some new locations recently made this side of Granite wells. They are claimed to be very favorably located, and are six or eight miles nearer the railroad than the older locations. The claims have only been partially prospected, but enough to cause the owners to be highly elated over what they have discovered. They intend to do more work on the claims as soon as possible, and put them in a condition to meet with a ready sale. The lowest assay made was eleven per cent, and the highest ninety. It may take some time to put the mines out there in a condition to command good prices, but the time is coming when they will be opened and be a source of great wealth to the county.

Sierra.
NUGGET.—*Mt. Messenger*, June 9: A nugget, weighing 12 ounces, two of which is quartz, worth about \$200, was picked up in the ground sluice, last week, at Mowry and Eggleston's diggings, Craycroft hill. The Extension Co. took out 88 ounces and 6 pwt. of gold, last week. An old miner remarked that it was the handsomest lot of gold dust he ever saw. It brings \$18.60 per ounce before melting. Its true gold value at the mint is \$19.72.

Shasta.
FROM FRENCH GULCH.—Cor. Shasta *Courier*, June 9: The deal in precious metal increases; the mines grow better. Jim Blakemore, (Old Red as the boys used to call him in early days, when he was really a boy) has found a big prospect in Jennings's, a branch of Eastman's gulch, many think it is the father of all the lodes in the Deadwood locality. It

1000 Argentina.....	200	101 Alta.....	280
100 Ames.....	750	385 Andes.....	50/50
100 Alta.....	690	300 B. & Belcher.....	50/50
50 B. & Belcher.....	550	200 Bodie Con.....	100
150 Bodie.....	100	250 Belmont.....	500
300 Bullion.....	1.25	500 Butte.....	11/101
100 Belcher.....	1.65	385 Challar.....	50/3.55
500 Cal. Virginia.....	700	300 California.....	400
240 Cal. Virginia.....	700	500 Cal. Traviin.....	750
50 Crown Point.....	1.60	50 Confidence.....	100
150 California.....	250	100 Caldenia.....	250
150 Caledonia.....	250	100 Challenge.....	500
500 Challenge.....	500	500 Con. Imperial.....	100
385 Gold & Curry.....	3.450/3.41	200 Eachother.....	50/55
150 Hale & Norr.....	75	450 Elco Con.....	200
150 Independence.....	350	200 Grand Drive.....	150
800 Mexican.....	1.25	450 Hale & Norr.....	1.620/7.07
100 Navajo.....	1.65	450 Mexican.....	4.650/4.71
50 N. Belle Is.....	200	100 Navajo.....	1.65
200 N. Belle Is.....	3.350/3.40	500 Nevada.....	1.50
120 Nevada.....	350	500 Ophir.....	3.700/3.95
200 Occidental.....	350	200 Overman.....	600
475 Potosi.....	1.40	1023 Potosi.....	2.500/1.55
400 Union Con.....	350/3.61	500 Silver King.....	1.750/1.75
200 Sierra Nevada.....	630/61	100 Senator.....	100
450 Scorpion.....	350	200 Scorpion.....	350
100 Scorpion.....	100	100 Silver Hill.....	67/71
100 Silver King.....	350	100 Silver Hill.....	67/71
50 Utah.....	5.10	2403 Union Con.....	81/83
1300 Union.....	7.00	165 Utah.....	3.200/3.30
290 Yellow Jacket.....	4.750/4.88	750 Yellow Jacket.....	3.05/3.15
100 Yellow Jacket.....	4.750		
100 Arizona.....	20/25		

is, I believe, on the opposite side of the ridge from Deadwood, and is a ledge from 15 to 20 inches in width, though they are competent judges, think the quartz is very good, setting the average value \$200 per ton, others think it will give returns far in advance of those figures. Ten thousand dollars was offered for one mine in the Deadwood district, and \$15,000 for another and been refused by the owners, who know what they are worth. Frank & McDonald Bros. had another shovelled up last week of between 23 and 24 tons and got a \$5,000 date, and there is no stock for sale there. L. Hootaling and Mr. Eaton, of Redding are mining in the East Fork district which contains huge possibilities.

Tetbury.

BUCKLEY HYDRAULIC.—*Or. County Journal*, June 9: Mr. Yale has leased the mine for one year, and assisted by nine faithful workmen, he is doing good work. He has recently tunneled through the bed-rock some 10 ft upon the present bed-rock drift, giving him a greater fall for carrying off debris. This tunnel is some 50 ft long, and at the time of my visit, not quite completed. Going down a shaft about 12 ft, supplied with candles, we entered the tunnel and passed its entire length. This tunnel connects with another longer one at the base of the shaft. Some \$500,000 have been expended on this mine and its equipments, and present prospect of its becoming a paying mine are better than they have heretofore been. Only Phillips, at Lewiston, has recently struck a quartz lead that prospectively promises well.

NEVADA.

Washoe District.

CALIFORNIA. *Enterprise*, June 9: C. and V. winze sunk and timbered 10 ft. South drift on the 2,900 level advanced and timbered 13 ft.

UNION CON.—On the 3,000 level are cutting out a station in the joint Sierra Nevada winze.

OPHIR.—Are repairing the old Central tunnel, and putting new ladders in the main incline. Are extracting ore from the croppings. Have started the pumping engine. There have been 523 tons extracted and sent to the mills.

SILVER MOUNTAIN.—On the 3,000 level are cutting out a station in the joint Union Con. winze.

CHOTLAR.—During the seven days ending this date 14 ft were added to the length of crosscut No. 3, on the 2,600 level, making the total length 202 ft. On Monday, the 4th, work was suspended in the face of this drift, owing to the proximity of the west country. In the evening of the 4th, a drift was started southwest, at a point 12 ft west of the main lateral in crosscut No. 3. This drift was carried forward 22 ft. The material passed through was quartz, porphyry and clay.

YELLOW JACKIE. At the Winters shaft we are extracting and shipping about 150 tons of ore per day. The air in the north drift on the second level got so foul that we have been obliged to place a blower and air pipe to renew the same. Are making good progress in the work of reopening the fourth level, and have cleaned out and retimbered the west drift 125 ft from the station.

Belmont District.

IMPROVING.—*Courier*. The Belmont mine is improving at every point as the work of development advances. Very rich ore was encountered during the present week in the Knight ground, and also in the south tunnel. In the Moore & Martin ground, and at the north end, good ore is also encountered daily.

Bernice District.

WORK PROGRESSING.—*Silver State*, June 7: Bernice district is coming to the front as a mining camp. W. Gilbert, just in from the mines, reports the prospects as being first-class. There are 25 or 30 miners at work on the mines, several of which are yielding ore. The Silver Ridge and Wild Goose are producing rich ore, and Mr. Gilbert is here making arrangements to get teams to haul the "shipping" ore from those mines to the railroad, either to be worked here or sent to Salt Lake City. They have 50 or 60 tons at these mines ready for shipment, and any quantity of it in sight. Wallace Goodell is at work on the Golden Crown mine, and has several hundred tons of ore on the dump. A roasting mill is being erected by G. W. Botwell, to work the ore from this mine, and the mill is expected to be completed about the 1st of July. There are a great many other mining claims in the district, on which more or less prospecting has been done. Some of these are large-sized veins, which yield good milling ore that will not pay for shipment. It is expected that the new mill will reduce those ores at reasonable prices, and thus encourage the development of the district.

Bullion District.

A LIVELY CAMP.—*Silver State*, June 6: John E. Gilligan, of Elko, who has just returned home from Bullion Mining district, which lies near Cortez and some 25 miles south of Bismarck, gives the *Independent* a glowing account of the mines, the richness of the ore and the general prospects of the camp. He says a whirlwind of excitement regarding these mines is rushing through Lander county and spreading like a prairie fire. The denizens of Lewis are just packing their goods—and houses, too—on jacks, and navigating bags and baggage to the camp. Three mines have been sold to outside capitalists, and two other bonded within the past two weeks, and three newly incorporated companies are now shipping out to Bismarck with which to begin operations. About 200 prospectors are in the district. The live-stamp chloride mill—only one in the district—is turning out 300 pounds of bullion per week, and they are now grading for the erection of an improved ten-stamp mill immediately. Other mills will also quickly follow, for there is plenty of ore to keep them steadily employed. Mr. Gilligan may possibly be over-sanguine, but in speaking of those now going into camp he remarks: "They have got natch the best of those who rushed out to Arizona, Wood River and other foreign excitements, for before the latter can get back, a town lot in the city of Bullion will be in itself a bonanza."

Columbus District.

MOUNT DIABLO.—*True Vision*, June 9: The intermediate drifts below the third level, and west of winze No. 1, is giving a small amount of \$75 ore. The ledge in the slope east of winze No. 2, is in two and one-half feet in width, and a says \$65 per

ton. The bopes near the head of winze No. 2, both above and below the third level, are looking well and yielding considerable \$80 quartz. A small amount of \$100 ore is being taken from above and below the third level, near winze No. 1. The intermediate drift, nearly above winze No. 1, between the second and third levels, is producing some \$200 ore from a 10-inch ledge. The slope above the west drift from the Callison winze is looking well and yielding considerable ore. The western end of this slope does not look so well, but the center and eastern end both show improvement. The ledge averages two and one-half feet in width, the ore averaging \$75 per ton in grade. The east intermediate drift between the first and second levels, is giving some \$100 chloride. A shipment of bullion amounting to \$5,807.42 was made May 31st, and one of \$6,874.61 on June 4th. The total shipments for May were valued at \$61,822.74.

Eureka District.

GOOD PROSPECTS. *Sentinel*, June 6: There has been a very perceptible brightening up among the growlers in the last few days. The names are brightening up, and that cause it. The fact is that the mining outlook was never better in Eureka county than it is to-day. We don't mean by this that more ore is being taken out or reduced, but we do mean that more mines are being worked and more custom ore is being reduced than ever before in the history of the camp. There is a large amount of money being turned loose in the camp, too. Where it goes to, the All-Seeing Eye alone can discern. There is a rat hole somewhere that nobody can locate. Nobody will admit that he is getting any of the here, and we'll swear that if the sack has struck anywhere in our immediate neighborhood we don't know it. The producing mines of the county during the first three months of the year, exclusive of Albion, these alone, paid out over \$150,000 for expenses. The Assessor's books show this. This is substantial and a thing of the present. The future is bright. All along the line we hear good news. At the Geddie & Bertrand, Supt. Clarke thinks they have a bigger body of ore than was ever uncovered in the mine before; the news of an old time bonanza is brought up from Mineral Hill, Safford makes a showing that warrants the most sanguine expectations; we do not agree with the *Express* in valuing the Onondaga at \$100,000, but every body that has seen it says that it is a big mine; Eureka Tunnel is showing up better and better all the time; the Albion is looking better to-day than at any time since it got into trouble; for the last six weeks almost every day we have had to chronicle the discovery of ore in some one of a thousand little mines; the Ruby Dunderberg looks as though it was about to be itself again; it had 10 tons of ore at the Richmond for sampling yesterday; and yesterday the Alexandria mine showed up a three-ft body of \$70 quartz ore in the winze. All we want now to make Rome howl is to make all these things stick and to strike ore in the drift from the Eureka Con. new shaft.

Mammoth District.

THE FLYING. *Grantsville bonanza*, June 4: H. Harries returned from an extended trip through Mammoth Mining district on Monday. He speaks in glowing terms of the mines he saw at Ellsworth and Marble Falls and says that he had no idea that there was so much ore exposed. He is confident that he can successfully locate the ores and leave a good margin of profit both for himself and the owners of the mines.

Silver Point District.

ORE.—*Belmont Courier*: From Joseph Enghouse we learn that Frank Carrio is about to ship a number of tons of first-class ore to the Jefferson mill for reduction. He also informs us that the mine owned by Postmaster Woodson Garrard, James Wilson and James Bryson is being worked constantly, and they are striking very good ore. The work of development is also being prosecuted with energy in the mines at Silver Point. There are now thirteen men at work in that district, and ore is being shipped to Jefferson for reduction. Silver Point is situated about fourteen miles west of Belmont.

Sullivan District.

WORK.—*Virginia Enterprise*, June 9: A few mines are at work in Sullivan district. Work was kept going on one or two claims all last winter. One of those days we are likely to hear of a strike in that region.

Taylor District.

ATTRACTING ATTENTION.—*Pioche Record*, June 4: This district is now attracting much attention, and it is on its merit, there being no excitement connected with it. The mines, says the *Pioche Record*, are not mere prospects, but have been worked to some depth, and good quantities of high grade ore are exposed in them. A town has been laid out and many of the vacant buildings in Ward are being taken down and conveyed to the new town in Taylor district.

THE MOUNT CORY BONANZA. *Virginia Enterprise*, June 9: There can be little doubt but a bonanza is about to be hatched at the Mount Cory mine, and Superintendent Patton, of the bonanza mine, has also gone out there. From all accounts the Mount Cory is a wonderful mine. It contains vast quantities of both free-milling and smelting ores. They will have both mills and smelting furnaces at work. All the ores have been so thoroughly tested by actual working that the owners know exactly what they will pay. By means of several tunnels, drifts and crosscuts, they have opened up a vast quantity of ore. All this was done before they made any move toward putting up reduction works, proving everything as they have gone along, and it is impossible for them to have made a mistake in anything. Other important discoveries have been and are still being made in the same region, and the indications are that at no distant day Hawthorne will be a very important mining center. Lumber, a few miles further out on the Carson and Colorado, is already doing quite an active business in the shipment of ores.

ARIZONA.

ROGERS DISTRICT. *Pinal Drill*, June 9: Donahue, Hutchinson & Co., started their new smelting furnace in Rogers district, on Monday last. It works on the World Beater Silver Chief, Manhattan and Johnny Carpenter ores. These mines are the property of F. E. Prosser and Clet, Cedingler. We witnessed the smelting process, which is perfect and the

mixture of ores from those mines forms a combination of all the required fluxes. A specimen of the bullion is to be seen in the store of Caddigan & Co. We judge that the bullion will run \$700 to \$1,000, to silver per ton, and 60 in lead. They can work about 1 tons per day, yielding about \$1,900 in bullion at a cost of \$40 per day.

THE MILL. *Arizona Sentinel*, June 9: The Royal Mining Co.'s mill at Pachuca is proving to be a success. The amalgamator, Mr. Chas. Smith, is entitled to great praise, as he is a test man who has successfully worked the Pachuca ore. The mill gets away with 20 tons in 12 hours, working the rock to above 60. The tailings only assay \$1.50 per ton. A new team has been started hauling ore, and the mill will consequently work day and night to-morrow. Frank Wilson is the able chief engineer of the works.

COLORADO.

BONDERED NEWS AND COURIER. June 9: A gentleman who is thoroughly posted on the mines of Bondered county stated to us on Wednesday that our miners could, between now and the first of June next year, produce two millions of dollars if the owners would let them. To show how they could do it, he gave us the following figures, which we find are verified by those who ought to know: The Yellow Pine mine has in sight \$1,000,000 worth of ore; the Slide has \$300,000; the Prussian \$100,000; the Thorburn, \$200,000 and the Inter Ocean \$50,000, making \$1,650,000 in sight. The smaller mines can bring the amount up to \$2,000,000 easily. He also says that on the completion of the railroad to Caribou, it will be an easy thing for Caribou Hill to produce 50 tons of smelting ore per day. Let us hope some effort will be made to try and get the owners of these mines to work them to their full capacity.

MONARCH. *Cor. Denver Republican*: In about ten days work will be commenced again on the Lexington, owned by Eli Tommala and Geo. L. Smith. This property lies on a direct line between the Madonna and Mount mines. Discovered in 1879, and with such prospecting as was then done on it, showed conclusively that it contained mineral. At different times small shipments have been made amounting to several tons, the returns from which showing from 30 to 80 ounces in silver, and an average of 40 percent in lead.

THE FAIRPLAY LODE was discovered and located in 1878. After passing through a number of ownerships, became, by purchase, the property of its present owner, J. S. Boone, who, in September, 1882, began development. The average returns from shipments have been \$53 per ton, net, clear of every expense. The mine in its present capacity can turn out ten tons of ore per day, and it is expected that when the new tunnel reaches the ore body the output can be doubled. Three shifts are worked in twenty-four hours, eight hours each. The ore, like the other ores of the camp, is free smelting, of the character so much in demand throughout Colorado.

THE MONARCH MINE has resumed shipment the trail being clear of snow. This week three carloads, thirty tons, were shipped to the Grant smelter at Denver. The building of the railroad is progressing steadily, the grading of the highest and most difficult points along the route are being worked upon with vigor, the level and easier portions being left for later on in the work.

IDAHO.

WORK WAS DISCONTINUED. *Wood River Times*, June 9: John V. Purwell and Asa W. Clarke, owners of the Narrow Gauge mines, have had a disagreement, and application has been made for a segregation of interests. This accounts for the recent suspension of work on the Narrow Gauge-Bannack group.

ATLANTA ORE.—Major Pett, Supt. and part owner of the great Atlanta mine, at Atlanta, who is spending a few days in Hailey, received a note from his foreman last night, which read as follows: "Four hundred level all O. K. We cut the ledge last night (on the 28th) and cut six inches of ore." This proves the continuation to this level of the ledge and ore-body formed on the upper levels, and indicates the existence of a bonanza of no mean proportions. Major Pett felt very confident that this would be the case, and he has not been disappointed.

THE ST. PATRICK MINE SOLD.—A letter from the East informs the *Times* that Dr. Hayford, who was a partner of Colonel Adams, who was killed in this city last summer, has just sold the St. Patrick mine, which is situated near Bellevue, to a Baltimore, Md., company, organized for the purpose.

MILBURN FURNACES BURNING. Lee Baker, returned last night from a trip to Milbourn. The Milbourn furnaces are running on Milbourn ore, and turning out bullion steadily; but the town is very quiet, owing to the fact that wages are low and very few men employed.

MORE MINERAL. *Ketchikan Keystone*, June 8: Messrs. J. H. Adams and J. H. Cassidy, two well known and respected miners of Wood River, having leased the Imperial, in Greenhorn Gulch, for a length of time started in on a tunnel above the mouth of the discovery shaft, and followed the vein a distance of 60 ft extracting sufficient ore to pay expenses. About four ft from the breast of the tunnel, which by the way is the very first work of development on the location, a prominent vein of quartz began showing to galena, and it still continues showing in the breast, at time of our visit, fully two ft of solid galena. This extends from top to bottom of the tunnel and an unknown distance beyond. The ore vein is distinctly visible from side to side and top to bottom, sparkling in a luster of brightness. We have seen nothing in any prospect of equal development to surpass this, and are jubilant with the owners in the sense of an extensive addition to the mineral wealth of Wood River.

MONTANA.

SHORT SHIFTS.—*Battle Miner*, June 7: The Poser continues to improve with developments, and is likely to prove one of the biggest properties in the camp. The Montana Copper Co. are producing 20 tons of matte and are shipping a large amount of high grade ore to Europe. Prospectors report the finding of good placer diggings at the head of Pipestone Pass, and that a party who left here 60 days ago are making \$7 per day to the man. Clark's fraction, which lays between the Alice and Magna

Charta properties, is producing some very high grade ore. John Noyes is working his placer, and a lot of this city with a large force of men and with good results. The Silver Bow mill is running on Shoshone ore this week. Rumor of the sale of the Bell Charta, which became current last week, are unconfirmed. It is one of the group of properties which recently passed into the hands of Judge Davis. The Lexington bullion shipment yesterday was one of the most ever made from the camp. Twenty-three bars were shipped valued at \$45,000. A large number of small prospects, lying north and south of Walkerville are being worked this summer. The new three-compartment shaft at the Bell has reached a depth of 40 feet. The Bell smelter continues to produce its 60 tons of matte per day with a single blast running. The winze from the 400-foot south-west drift at the Mountain has penetrated a fine body of ore, which samples, from 30 to 60 ounces. The vein of high grade ore in the east drift, north vein, at the Magna Charta yesterday. The vein is two feet wide and samples \$75. The 250-foot east drift, at the Shoshone has advanced 200 feet from the shaft. The pay streak in the lode is now three and one-half feet wide and pays out a mill average of 60 ounces. The Silver Bow mill commenced running on ore from this mine at noon yesterday.

NEW MEXICO.

BLITZ. *Southwest Sentinel*. The present average daily shipment of high grade ore from the "Old Man" mine at Deming, is about twenty tons, two carloads leaving the Silver City depot each afternoon. Partial returns received from the Hilder-Sueher company upon former shipment of low grade ore have been about \$2,000 each day for the past twenty days. These facts are tangible, and a plain statement of them is worth more than a dozen columns of vague, indeterminate puffing.

BIG STRIKE. A big gold strike was made in the Phoenix mountains a few days ago. Particulars will soon be furnished. They are gold quartz leads, and several have been located to date. Locations are still going on, and the prospects are that it is a very rich find. Look out for another big bonanza in this section.

THE HILDER-SUEHER. At Albuquerque, has about 100 tons of ore in its bins, with ten more carloads on the road.

KINGSTON CONCENTRATING WORKS. *Tribune*: Mr. F. G. Caldwell, representing a company with ample capital, has just completed the main building designed for the reception of concentrating machinery, and proposes to have the works in active operation within the next thirty days. The machinery will be driven by a twenty horse power engine, and for the present will consist of works capable of treating ten tons of ore per day. These works are designed for the treatment of the low grade ores of the camp, and this first plant, if successful, will be added to from time to time as the business demands. Mr. Caldwell informs us that he will either concentrate and return the ore to owners, or ship, at the option of customer. Twenty ounces ore will be available for this process, and can be reduced to the proportion of one ton from six or eight.

KINGSTON. No camp in New Mexico gives brighter promise for the future than Kingston. Not a claim has been developed that has not improved as depth has been gained. Many of the prospects are phenomenal in the yield they have afforded from the surface down. For its age, the Pachuca district has more producing mines than any in the Territory, and some of them are paying handsome dividends beyond their entire cost to the present owners. The North Pachuca and its tributaries, the Middle and South Pachuca and tributaries, the Triple and Terra Blanca and their tributaries, all have along their courses magnificent prospects and paying mines. The whole country appears to be thoroughly mineralized.

OREGON.

MINERAL DISTRICT. *Cor. Redrock Democrat*, June 6: Never has our mining camp seen so healthy an aspect as at present. At first regarded with suspicion and distrust it has now, owing to the energy and industry of its few pioneers, gained the confidence and favor of capitalists to a large degree and can enlist their aid to a greater extent than any mining field of the same age on the coast. Though prospecting is being vigorously pushed and rich discoveries are of frequent occurrence, we have none of that wild unwholesome excitement, which has proved the curse of so many promising fields, and brought ruin to so many sanguine persons. The steady determined industry exhibited by our mining population reflects credit on them, and augurs well for our future, and if our camp ever attains the position, present prospects predict, it will be gratifying to know their energy and perseverance has not the reward it so justly merits. It is useless to attempt enumerating our many valuable mineral deposits, but I consider myself perfectly justified in advising any person looking for a safe and profitable investment to visit us; what we now require is men of money and energy; to such our camp offers splendid inducements.

UTAH.

DANA GROUP. *Salt Lake Tribune*, June 6: The Dana group of mines at Park City, lying west of the Ontonagon, comprises 25 patented claims covering about 150 acres of surface. On these claims, to this date about \$78,000 have been expended, and now the property is in a fair way to soon make itself known by the ore output which must follow the development to be made from this onward. Mr. Daly resigned his position as superintendent of the Crescent mines that he might look after his interests in the Daly group. He will sink a two-compartment shaft to a depth of several hundred feet for the purpose of developing a vein which he has been prospecting by tunnels for several years, and which has been proved a distance of 5,000 ft, showing ore running from \$200 up to \$1,800. He has between 10 and 15 tons of ore on the dump. The vein is a strong and good one, and there is little doubt but the property will prove a most excellent one when properly opened. Mr. Daly has been in Park City the past three years, and has had extensive experience in mining, having come to Utah in 1870. He afterwards went to Nevada and California

The Sawtooth Country.

A correspondent of the Salt Lake *Tribune* says: I got into this part of the country a week ago to-day, and to say that I was surprised at the prosperous outlook of this district, would be drawing it quite mildly, considering that I had been led to expect, from reports by those "know-it-alls," that a traveler will often run across on Wood River, I had been told that the "upper country," as Vienna and Sawtooth are called, was a district where no paying mines existed, where ores were terribly low grade, and base at that; where "copper mills" were being remodeled to crush the product of the country; where snow was twenty feet in depth, and salt bacon one dollar per pound, and other eatables in proportion. Such reports must originate from old-time members of a lying club. Notwithstanding the drawbacks mentioned, I came right along through Wood river and reached the summit of the Wood River and Salmon river divide, and from that elevated position I saw bare ground in all directions, excepting upon the high peaks and upper part of the gulches surrounding the valley of the Upper Salmon. Descending the mountain, I made my way toward Smiley canyon, and until I reached a point within four miles of the town of Vienna, I encountered but very little snow. As it was early in the morning the crust was sufficiently hard to bear one's weight, and no difficulty was experienced in reaching Vienna. I found the town just starting in for a summer's campaign. Everybody seemed to have some building to fix up, and the inhabitants, generally, had the appearance of a go-ahead class, which is characteristic of towns that have something like a solid

competent to judge estimate at least \$150,000 blocked out ready for shipping.

Yet, in the face of these facts, there are parties who will say there is no backbone to the Sawtooth country. But never mind, "Truth crushed to earth will rise again," for the districts of Vienna and Sawtooth never had a brighter future ahead than they have to day.

About fifteen inches of snow yet remain on the ground around Vienna city. The streets are bare and the snow is disappearing very rapidly. Our mail arrives and departs via Cayuse. Pack trains are coming into town and wagons will very soon follow. The roads will be in good condition in ten days or two weeks, to this place.

Prospectors coming to Sawtooth and Vienna can come right along now, and by the time they get here and get outfitted the snow will be sufficiently gone to allow of prospecting the surrounding country.

Paradise District, Nevada.

For some time past J. V. McCurdy, an experienced and practical mining and mill man, has been at work with a view of starting up the Paradise valley mine and mill, which have been shut down for over two years past. After considerable trouble and expense, and several trips to San Francisco and the Paradise mines, he succeeded in purchasing the Wild Goose mine for the Paradise Valley company, and he is now making arrangements to commence work on both mines and get the Paradise Valley company's mill in running order. It is estimated by experts, who have examined the Paradise

Minnesota District, Arizona.

From the *Mohave Miner* we take the following: The Minnesota district was formed December 27th, 1880, and probably less is known of it than any other district in the county. This is probably due to its isolated position, lying as it does out of the usual run of travel. The nearest settlement or mining camp to the district is El Dorado canyon, which lies on the opposite bank of the river from the district and about eight to twelve miles from the nearest mines. Mineral Park is some forty miles from the district in a southerly direction. The district is some twenty miles square and is bounded as follows:

Commencing at Johnson's rock on the Colorado river and thence running east twenty miles; thence north twenty miles; thence west to Roaring rapids on the Colorado; thence down the river to the place of beginning.

The general character of the country may be termed desert in the truest sense of the word, the entire area included in the boundaries of the district being totally devoid of wood and water and containing nothing in the shape of vegetation but cactus and a little brush, except on the bank of the Colorado where plenty of cottonwood and mesquit is found. As to the mineral wealth of the district very little is really known so far, as very little prospecting has been done. It is well known, however, that a great many well defined ledges varying in width from two to 20 feet and more do exist, and that they are mostly of low grade, some of them containing, however, bunches of very rich ore. What little work has been done in the district has con-

tons of ore was taken and hauled to the Lincoln mill, a distance of twelve miles, for reduction. This ore worked \$120 per ton. The vein from which it was taken averaged about eighteen inches in width, the ledge being very spotted.

Etiwanda Canyon.

We present on this page a very fine view of the Cascades in Etiwanda canyon. It represents a portion of the scenery on the headwaters of one of the streams in the Cucamonga mountains, that furnish water for the Etiwanda settlement. This canyon was formerly known as Day canyon, but more recently it is called Etiwanda canyon, after the settlement planted by the Chaffee brothers and which has become of prominence in southern California during the past year.

BEER AND BUNNING IN MINING CAMPS.—"A year ago in the University of Berlin, now in a mining camp of the Wasatch Rocky mountains selling cigars for a short bit." That is how a young man put it to us in Park City the other day. We couldn't help asking (to ourselves) why sell cigars at all? And the same query touching cigars and beer and spirits occurred to us as we passed in and out (on business) of the score of saloons along the main street of that town, making a miserably poor living, while the hills are full of fortunes for the energetic worker. Living a camper's life, cooking and washing for one's self, without any of the comforts or requirements, on the slim profits of selling beer. It would make a new town of it, if nine out of ten of the saloon keepers would close out to the



CASCADES IN ETIWANDA CANYON, SAN BERNARDINO COUNTY, CAL.

foundation to build upon. Quartz camps, as a general thing, take a longer time to come into prominence than a galena district, but when they do reach a paying position, they remain there a greater length of time than those districts, where a ten ton freight car will carry all the ore extracted in three years' development work. These quartz mines go down to the deep, and thus far have proved themselves to be much richer and the ore more abundant as depth is attained.

A fine twenty-stamp Frasier & Chalmers' dry crushing mill is fast nearing completion at the outskirts of the town. There is plenty of life around the Vienna company's mill, which, under the able superintendency of Captain Henry Guyer, who informed me that the mill would commence dropping stamps within the next three weeks, or probably earlier, all owing to how soon the roads would become passable for heavy freight wagons. The road winds its way up past the basin and is intended for hauling the ores of the Mountain King, Solace, and Vienna mines. These three mines were the only properties of any great importance developed during the past winter, with the exception of the Nellie group, which closed down along the middle of the winter, owing to an avalanche that swept over the cabin, killing two of the men. Several hundred tons of ore are on the dumps, and in the ore house of the Mountain King mine, awaiting the arrival of teams. Many thousand tons more are blocked out in the mine, ready for shipping, but until the ore can be hauled away to the mill, it will not be extracted. The Vienna property has also many hundred tons awaiting the arrival of the ore haulers. The Solace mine has developed wonderfully well this winter. Men

and Wild Goose mines, that there is at least 10,000 tons of good milling ore in sight in both mines, with a fair prospect of an unlimited supply of similar ore. This ore will be taken to the Paradise mill, on Martin creek, for reduction. The mill was built for dry crushing and there are roasters attached to it, but it will be changed to a wet crusher, as the greater part of the ore does not have to be roasted.

The resumption of operations on these mines is of great importance to Paradise merchants and farmers, as it will give employment to a number of men and put several thousand dollars a week in circulation. The Paradise Valley, during the short time it was worked, produced about \$500,000 in bullion, and unless the mining men, who closely examined and sampled it, are greatly mistaken, there is ore enough in sight to produce as much more. The Wild Goose mine is on the same lead as the Bullion of Paradise.—*Silver State*.

TUSCARORA NOTES.—The Basin Company's mill is nearly completed and ready for operation. It will start up sometime about the middle of the month. There is a considerable amount of ore already on the dump, and enough more in sight in the mine ready for stoping to keep the stamps running during the season. Present prospects indicate that the mill will render a good account of itself before the snow flies again. If the Basin Company makes the success which the present prospects justify the anticipations of, it will give an impetus to mining in a section of our district which has heretofore been sadly neglected, but which many experienced miners believe to contain the largest and most valuable mineral-bearing ledges in the vicinity of Tuscarora.

sisted in taking out a few of these rich bunches and taking the ore across the river to the Lincoln mill, at El Dorado canon, for reduction. About the first location made in the district was the old Jennie mine, which was located in December, 1880, by John Hewes, J. Baer, and others. These parties took out some rich rock and had it worked at the Lincoln mill. The ore worked so well, that the Lincoln Company immediately bought the claim, paying the owners \$1,000 each for their interest. The company at once put some men on the mine, who sunk a shaft some thirty feet deep besides doing considerable surface work, and at the end of about two months had cleared between six and seven thousand dollars. About this time the company became involved in litigation, which resulted in the closing down of the mill and everything connected therewith. Most of the ore taken from this claim during the short period it was worked by the Lincoln Company milled about \$425 per ton, the ore being rich in horn silver. There is two feet of ore at the bottom of the shaft, but it is of a low grade, the rich pocket evidently not going down to that depth. The company having become completely "busted," to use a homely but expressive phrase, this claim was neglected until on January 1, 1883, it was re-located under the name of the Ontario by J. Baer and J. H. Barker, Baer being one of the original locators of the mine, who proposed to do some work on it this year. This mine is eight miles from El Dorado canyon, over a fair road.

Another mine which has produced considerable ore is the Weaver, which was located a few days after the Jennie mine by John Weaver and others. The work done on this claim consists of a shaft and tunnel, from which some forty

tenth, shut up their shanties, and go to work, even for wages, if they couldn't strike out for themselves. The same is true of all other flourishing mining camps. You can always tell where the "boom" is, for every second door is a saloon, and not one man in a hundred of those who thus follow and prey upon the mining industry make a half decent living out of it, while there are very few of them who are not ashamed of it. There is not even money to be made out of it; and if not that, or some sort of a comfortable living, what is there?—*Salt Lake Tribune*.

THE TIFFIN GROUP SOLD.—The Tiffin group of claims, in Narrow Gauge gulch, Deer Creek, which comprises claims known respectively as the Tiffin, Tiffin No. 2, and Seneca, and which adjoin the Forest Creek group on the west, were sold yesterday to the representative of some Tiffin, Ohio, capitalists, for the ridiculously small sum of \$3,000 - \$1,000 for each claim. This figure is much below the actual value of the property, but the Knukel Brothers, who owned it, also own a number of adjoining locations, and they sold the Tiffin group in order to get moneyed men interested in the District.—*Wood River Times*.

SCIENTIFIC MOVEMENTS IN CINCINNATI.—There has been unusual awakening in scientific circles in Cincinnati during the past few months; a polytechnic school has been organized; a State forest association formed, with its headquarters in Cincinnati; and courses of popular lectures on chemistry, zoology, botany and history, have been given at the afternoon school in popular science and history.

THE ENGINEER.

The New Egyptian Canal.

The New Egyptian canal seems to be a foregone conclusion, not so much on account of the international complications attending the present Suez canal, but because of the press of business seeking that way of transit to and from the Atlantic and Indian oceans. A special meeting of all parties interested will be held in London some time during this present June for the purpose of considering the three schemes for the canal, which are as follows: First, a new canal parallel with the one now in existence, to cost £6,000,000. The second for a canal from Alexandria up the Nile, passing north of Cairo to the Red Sea, and the third south of Cairo to the sea. Each of the latter, it is estimated, will cost £12,000,000. A majority of the committee favor the Alexandria route. French opposition to these schemes is ridiculed, and the monopoly claimed by M. de Lesseps for the Suez company is considered untenable. An English syndicate has already received offers for the whole capital required. The present canal is bringing in about \$50,000 per day, hence there can be no doubt but that with the constantly increasing rate of business, a second canal will pay from the start. No nation has the title of interest which England possesses in the undertaking, and there is no doubt but that English capital will put it through at the earliest day practical.

A NEW KIND OF MOUNTAIN ROAD.—An exchange says that a tramway is to be built up Pike's Peak, which will overshadow the Mount Washington railway. The plan is to construct three of these tramways, each nearly three miles long, one beginning at the end of the other. The first will start at the rear of the iron springs, at Maniton, Col., and the last will be terminable in front of the signal station on Pike's Peak, an elevation of 14,200 feet. The supports will be made of trees not less than eight inches in diameter, and about twenty-four feet high, braced above and below. On these an endless wire cable, of one inch bore, will revolve, and upon which will be fastened, at intervals of about 100 feet each, a large covered armchair, in which two persons can comfortably sit. This will be suspended about eight feet from the ground, and pass at entering and discharging points along a movable platform to load and unload, without stopping. The lower section will be propelled by an engine at the lower end. The center one will be driven by water power, utilized on the mountain side through a turbine wheel, and the third by an engine erected on the summit of the peak.

STRENGTHENING A FOUNDATION.—An interesting way of strengthening a weak foundation was recently tried on a new building that suddenly commenced to settle. The excavation for the walls had been carried down until a mixture of coarse sand and gravel was found, which was deemed suitable. During a heavy rain water found entrance to the cellar, when the sinking resulted. The building was braced, the cellar drained, and then the inside wall of the foundation was uncovered down to a little below the bottom. A λ -shaped piece of masonry having a height of about twice the width of the base was then built, the bond between it and the wall being carefully looked to. After this had been finished upon the inside, it was repeated upon the outside. The base of each of these pieces was equal in width to that of the wall, so that the operation practically trebled the bearing surface of the foundation. It may be well to add that the water will not again be permitted to enter that cellar, as every passage way has been securely closed.

THE ST. GOTHARD TUNNEL.—Investigations have been made of the cause of weakness in the parts of the St. Gothard tunnel where the vaults were crushed, and it is thought that the accident must be attributed to the action of damp air upon the shists and gneiss, and to the decomposition which resulted therefrom. The presence of anhydrous sulphate of lime, or karsenite, was also an important agency, its transformation into gypsum being followed by a dis-aggregation which renders the rock incapable of sustaining its pressure. Other hypotheses have naturally been framed, but this is considered as the most plausible.

THE MERSEY TUNNEL.—Rapid progress is now being reported in connection with the tunnel of the Mersey railway, England, and nearly 700 men are said to be employed, both night and day, working in eight-hour shifts. The tunnel will be three and one eighth miles in length. The drainage headings are about 100 yards in advance of the main headings, and will act as reservoirs, into which the water from the main tunnel will be drained and run off to both sides of the Mersey, where pumps of great power will raise the water to the surface.

THE NEW BRIDGE across the Firth of Forth, now building, will, when completed, be among the most remarkable bridges in the world. The main girder will be within a few feet of a mile in length, and will rest upon round cylindrical piers, each of which will weigh 16,000 tons. It will, of course, be high enough for all vessels to pass underneath, and about 42,000 tons of steel will be required in its construction. The estimated cost will be \$7,500,000.

USEFUL INFORMATION.

Rendering Cement Airproof.

A method of rendering cement impervious to air has been successfully practiced by Herr C. Pascher. This experimentalist claims to have found that the only way to render cement unalterable by atmospheric influences is by the application of a cold solution of one part of sulphate of iron in three parts of water. The articles to be protected should be left to soak in the solution for twenty-four hours, when they take a greenish-black tint from the hydrated protoxide of iron. The absorbed solution is decomposed in the interior of the cement, which is increased in weight ten per cent. All the pores of the mass are thus stopped by the hydrate, and as this compound is not attacked by air, the cement itself becomes impervious. Cement facing may be washed down with several coats of the solution. When dry, the cement may be covered with a wash of ochre, or by a solution of sulphate of alumina. If a greenish-white face is desired, the surface may be first washed with a solution of chrome alum, and then with soapuds. Either of these coats may be painted or colored in distemper. It has been observed that when oil colors are laid upon bare cement they easily peel or scale off; but this inconvenience may be avoided by washing the cement thoroughly with soapuds, and when perfectly dry rubbing with a brush or linen cloth until the surface shines. Afterward the oil colors may be applied in the usual way.

ORIGIN OF THE NEW YORK AND BROOKLYN BRIDGE IDEA.—The question by whom the idea of erecting a bridge between New York and Brooklyn was originally conceived, is apparently settled by a communication to the *Journal of Commerce*, in which journal, moreover, the first public mention of the scheme was made. A correspondent of that paper writes: "In the month of February, 1853, my uncle, the late John A. Roebling, accompanied by his wife and son Washington, then a lad of fifteen years, came from Trenton to my house in Hicks street, South Brooklyn, to attend the christening of my infant daughter Amelia. Returning in the afternoon by the Hamilton ferry, the boat was caught in the ice, and drifted round in a helpless condition for three or four hours. A boat load of soldiers who were east away from Governor's Island were rescued on the trip. Mrs. Roebling was in great anxiety of mind, having left an infant child at home. Mr. Roebling then took a solemn vow, in the presence of the hungry, half-frozen passengers, that if his life was spared he would yet build a bridge across the East river. * * * His vow and the crowning idea of his life have been carried out, not by the father, but by the son who stood so nobly by his side."

POSSIBLE CAUSE OF FIRES.—Are not some fires of apparently inexplicable origin to be explained upon the theory of Prof. Magnus, that iron is combustible just as grain dust is explosive, when mixed with air in certain proportions? The simple experiment of Magnus is thus described: "The pole of a good sized magnet is approached to a mass of iron filings, a bunch of which readily attaches itself thereto. In this condition, being not only in a highly comminuted state, but carrying a large quantity of air mechanically entangled in the loosely aggregated mass, the iron is in so favorable condition for combustion that the approach of an ordinary spirit lamp is sufficient to inflame it—in fact, it burns readily and continuously like any ordinary combustible." We can see no reason why these necessary conditions should not occasionally occur in shops where mixed work is done, and the absence of wooden shavings or the like from the neighborhood of a light would be taken as evidence that the cause of disaster did not proceed, even remotely, from the presence of the light.

NEATSFOOT OIL.—This oil varies in quality as regards what part of the feet it is taken from. The mode of obtaining it is as follows: The feet and hoofs of neat cattle are cut off about eighteen inches above the hoof, denuded of skin and slit up longitudinally. Near the hoof is a small mass of soft fat, which is scooped out with the knife, and set aside for the preparation of the best quality of oil. The hoofs are washed in cold water, and then boiled in open pans set in brickwork, and heated by a fire beneath. A certain quantity of oil is thus boiled out of them, and when skimmed off, forms an inferior grade of neatsfoot oil. After about three hours' boiling, the tissues between the horny hoof and the last digit bone are sufficiently softened to allow of the latter being easily scooped out of the hoof with a knife. These "cores" consist of bone, gelatinous matter, and fat, and together with small pieces of fat, previously alluded to as being removed by the knife before boiling, are put into a separate pan of fresh water, and all boiled together for the extraction of the oil. This forms the best kind of neatsfoot oil.

AN ANCIENT GREEK BRONZE HORSE.—Grecian reports state that recently, as some Ægean fishermen were fishing for sponges, near Delos, they came upon an ancient bronze horse at the bottom of the sea, about two fathoms and a half deep. It is described as being of colossal size and almost covered with shell fish. After much effort the fishermen succeeded in break-

ing off one of the feet of the horse, and took it home to Egina, where they offered it for sale. The matter came to the knowledge of one or two archeologists, who purchased the equine bronze foot. This they found to be of excellent workmanship, and it appears clearly to indicate that the equestrian statue is a valuable relic of antiquity. It has accordingly been determined to endeavor to discover the whereabouts of the horse, and to fish it up, if possible, entire. It is suspected that the statue is probably an ancient votive offering, which was once set up in the island of Delos. The interest felt in the matter is all the greater as, if the work is recovered, it will be the first bronze horse of a large size which has been preserved since the classical age of ancient Greek art. There are very few equestrian statues preserved from ancient times, and hardly one which can be demonstrated to be of Greek origin.

WATER POWER OF THE ALPS.—It is now proposed to use the enormous water power of the Alps for working electric railways in Switzerland. Operations are understood to be in progress now to connect the towns of St. Moritz and Pontresina by an electric railway four and three-fourth miles long, the motive power to be supplied by the mountain streams. Should the experiment succeed, the undertakers of the railway will extend it to the north for a distance of some forty-seven miles, and in a southerly direction for about thirty miles, and thus effect a second junction between the Swiss and Italian railways.

MUCILAGE FOR ENVELOPES.—Take a quarter of a pound of gum Arabic, dissolve it in one pint of boiling water; add a piece of borax as large as a walnut; when thoroughly mingled with the water—which can be done by frequent stirrings—bottle in a large-mouthed bottle; through the cork pass a hen's feather, and you will have a pint of mucilage as good as the best; shake the bottle occasionally for three or four days after it is corked. If the weather is hot, a tablespoonful of alcohol will prevent all mold.

IMITATION CAOUTCHOUC.—Dankworth and Landers, of St. Petersburg, have invented a composition which is elastic, tough, waterproof and insulating, and which is applicable to nearly all the purposes for which India rubber is used. It is composed of a mixture of wood and coal tar, linseed oil, ozokerite, spermaceti and sulphur, which are thoroughly mixed and heated for a long time in large vessels, by means of superheated steam.

GOOD HEALTH.

Is a Cold a Fever?—A New Theory.

The theory that colds are the result of exposure to cold or damp air is generally accepted. Indeed, most persons afflicted with this disorder are able to trace its origin satisfactorily to themselves at least, to some undue or unusual contact with outside air. They seek no other explanation. In the columns of the *Popular Science News* Dr. Page, of Biddeford, Me., undertakes to show the fallacy of such a course of reasoning. That his theory is new to most people is no proof that it will not hold good. Having made the subject of colds a special study for ten years, he concludes that the ailment which is universally called a cold is in reality a fever, and is directly caused by indigestion or impure air. He says: "Foul air prevents the purification of the blood; hence the accumulation of impurities which in their exit give rise to the symptoms popularly supposed to indicate cold. Hot living-rooms render impossible the digestion of more than a little food, and that of the plainest sort, by making only a little necessary."

Indigestion results from eating improper food, or some degree of excess, the excess being either positive or relative, according (1) as the skin is more or less sweltered with clothing, (2) the lungs more or less outraged by bad air, and (3) the entire organism more or less invigorated by fresh cold air. It is unquestionably true that when, by reason of wrong conditions, the system has become ill-conditioned—that is when there are impure matters to eliminate—some chance exposure to a bracing atmosphere may so invigorate the organism by the presence of fresh air in the lungs and its touch upon the skin that the process of elimination begins, and but for the return to the close overheated atmosphere of the home, this process would often be completed all unconsciously to the individual, who now makes the great mistake of 'confounding the cause of his recovery with the cause of his disease.'"

Dr. Page disapproves of covering the body with a superabundance of clothing. People sometimes take cold by putting on flannels. Care should be taken to regulate clothing by the weather. In conclusion the doctor says that if it could become popularly known that the symptoms observed in cases of "cold" were evidences of an effort on the part of the organism to eliminate impurities which have been collecting perhaps for months, and that "fasting, fresh air and exercise are nature's triple panacea" for the disorders, a very great proportion of all severe sicknesses would be prevented. *Popular Science* remarks that without presuming to question the efficacy of the doctor's remedies for colds, we think there are compara-

tively few people possessed of sufficient temerity to discard the winter flannels with pneumonia or a kindred disease staring them in the face.

THE DELUSION OF ARSENICAL BEAUTY. says the *London Lancet*, has broken out afresh. That paper utters a warning cry against the mischievous error that "arsenic in small doses is good for the complexion." It is not difficult to imagine the risks women will incur to preserve or improve their "good looks." No more ingenious device for recommending a drug can be hit upon than that which the authors of this baneful prescription of "arsenic for the complexion" have adopted. Suffice it to recall the fact that for many years past chemists and sanitarians have been laboring to discover means of eliminating the arsenical from the salts coloring matter of wall papers, and certain dyes once largely used for certain articles of clothing. It is most unfortunate that this hopelessly antagonistic recommendation of arsenic to improve the complexion should have found its way into print. Those who employ the drug as advised—and there are many either already using it or contemplating the rash act—will do so at their peril. So far as they are able, however, it will be the duty of medical men to warn the public against this pernicious practice, which is only too likely to be carried on secretly. It is not without reason that we speak thus pointedly, and urge practitioners to be on the *qui vive* in anomalous or obscure cases.

SPECTACLES.—There is no particular age at which spectacles are required. As a rule, men need them between forty five and fifty, and women after forty. Many persons object to using spectacles because they think it makes them look older, and so injure their eyes by straining them, when if they had used spectacles it would not have happened. When one cannot see clearly by gas light or lamp light without holding the object further from the eyes than is agreeable or natural, then they require spectacles and are injured by not using them. Often the injury is such that no optician can remedy it. Another very good test of the eye to see if there is any difficulty at first sight in distinguishing the figure 3 from 5 in ordinary reading by ordinary light. If there is, spectacles are needed.—*Herald of Health*.

THE RAPID INCREASE OF INSANITY in this country is fearful to contemplate. Insanity costs the state of Massachusetts \$800,000 a year. Every insane person represents a dead loss of at least \$5,000 and an indirect loss of much greater. This represents an outlay of \$200 a year for as many years as the patient lives. Insanity is increasing in this State rapidly, and fresh inquiries are made as to the best way of treating the insane. The congregated system is denounced and the cottage system advocated. A new plan for the treatment of the insane is demanded here. Probably no State in the Union is so generally affected in this direction, as California.

PETROLEUM—ITS MEDICAL PROPERTIES AND USES.—The United States Dispensary, a standard work with druggists, says (page 1,582) that "In Germany petroleum is highly extolled as a remedy for tapeworm, and that it was often used with advantage in epidemic cholera by Dr. Androsky, of the Russian army." In fact, from the earliest discovery of petroleum to the present day, there has been a strong conviction that the good qualities of crude oil have not been appreciated, and that it undoubtedly possesses great medical properties. As a liniment it is certainly preferable to any of the oils. Its great penetrating powers and its freedom from rancidity, are advantages which no other oil possesses in so high a degree.

A CURE FOR BRIGHT'S DISEASE.—General Robert C. Schenck, formerly Minister to England, is now enjoying excellent health. A year ago, it is said, the doctor declared him to be dying from Bright's disease. "You have been too high a liver," they said; "but if you will come down to a prescribed diet, we may possibly save you." "What is the diet?" he asked. "Milk and tomatoes; and you mustn't touch anything else for a year." He agreed to it, so the story goes, and is now perfectly well and able to eat and drink whatever his appetite craves.

SMELL OF PAINT.—The *Herald of Health* says this disagreeable and unhealthy smell may be got rid of or greatly modified as follows: Slice very finely several onions, place them in water in the center of the room; close the doors and leave one window up a little for a slight change of air, and let them stand for a few hours, when the smell will have nearly all gone. If you have no onions use a handful of hay in the water, in the same way. These remedies are simple and always obtainable. If the room is very large, use two pails and double the quantity of onions may be used.

POISONOUS COLORS IN FOOD.—A new law has come into force in Germany, prohibiting the use of poisonous substances to color any food designed for consumption, or for the wrappers enclosing any article of food. The law extends, also, to the employment of any poisonous material in toys used for playthings for children, and in paper used for wall decoration, or dress material. Such a law is needed in some other countries besides Germany.



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SAN FRANCISCO:

Saturday Morning, June 16, 1883

TABLE OF CONTENTS.

EDITORIALS.—Timbering in Mines—No. 13; Silver Shoes and Dies; The Lower California Placers, 401. Passing Events; An Arrastra Mill; Government Bullion Statistics; Reduction Works; Mining Surveys; Electric Light in Arizona; The Campbell Process, 408. A New Barley Crusher, 409. Patents and Inventions; Notices of Recent Patents; Wrought Iron Pulleys, 412.

ILLUSTRATIONS.—Timbering in Drifts; Silver Shoes and Dies in Amalgamating Pans, 401. Cascades in Eldorado Canyon, San Bernardino county, Cal., 403. The Best & Althouse Barley Crusher, 409.

MECHANICAL PROGRESS.—A New Mode of Wire Manufacture; Floors Weakened by Gas Pipes; The Value of Inventions; Improvement in Hot-Air Engines; Malleable Nickel; Electricity as a Railway Motor; Cast Iron Chilled Tools; Don't Overdrive Your Machinery, 403.

SCIENTIFIC PROGRESS.—Tephelarge; New and Remarkable Chemical Experiments; The Chemical Effect of Sunlight on Plants; Hydraulic Silica; Vegetable Parasitism in Fishes; The Transmission of Sound Through Rock; Selenium as a Regulator of Heat; Will Gas Pass Through Stone, 403.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends and Bullion Shipments, 404.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Idaho, Montana, New Mexico, Oregon and Utah, 40-45.

THE ENGINEER.—The New Egyptian Canal; A New Kind of Mountain Road; Strengthening a Foundation; The St. Gothard Tunnel; The Mersey Tunnel, 407.

USEFUL INFORMATION.—Rendering Cement Air-proof; Origin of the New York and Brooklyn Bridge Idea; Possible Cause of Fires; Neatsfoot Oil; An Ancient Greek Bronze Horse; Water Power of the Alps; Mudlage for Envelopes; Imitation Caoutchouc, 407.

GOOD HEALTH.—Is a Cold a Fever?—A New Theory; Spectacles; Petroleum; A Cure for Bright's Disease; Smell of Paint; Poisonous Colors in Food, 407.

NEWS IN BRIEF.—On page 412 and other pages.
MISCELLANEOUS.—California then and now; Settling Tanks in Silver Mills; Colorado Ore in Utah, 402. The Sawtooth Country; Paradise District, Nevada; Minnesota District, Arizona; Eldorado Canyon, 406.

BUSINESS ANNOUNCEMENTS.

Chloridizing Furnace—R. A. Nevins, S. F.
Dividend Notice—Silver King Mining Co., S. F.
Mining Partner Wanted—"B. S.", San Francisco.
The Harmon Seminary—S. S. Harmon, Berkeley, Cal.

Passing Events.

The virtual bursting of the Lower California placer mining bubble is chronicled this week. The excitement was quieted much more quickly than such things usually are, not more than a month having elapsed since the announcement of the discovery of the mines. Now we hear there is no water to work the mines, and that they are worked out any how.

The conquering of the Arizona Indians by General Crook, who followed the murderous bands into Mexican territory, surrounded and captured them, with the chiefs, women and children, is a cause of great congratulation to all who desire to see the development of the Southwest go on as it should. For Arizona, particularly, the news is good, but New Mexico and the northern states of Mexico are fields for the adventurous prospector as well, which, however, were more or less dangerous while these hostiles roamed the land.

There is not much to record aside from this except what we elsewhere refer to. The mining business of the country is rapidly advancing in material prosperity, and, what is more, is daily becoming more generally recognized as a legitimate field for the investment of capital, the element of gambling formerly connected with it being generally eliminated.

An Arrastra Mill.

It is pretty well understood among those who work gold ores that there is nothing which can beat the common arrastra as an amalgamator. The only objection to it is its lack of speed, but perhaps that is really one of its elements of excellence after all. It may be that time is really a more important factor in amalgamation than it is usually credited with; and that one of the reasons of lack of thoroughness of more modern appliances is that they are constructed to hasten matters somewhat too rapidly. Whatever the reason, the old arrastra holds its own as an amalgamator, and many hundreds of them are doing service all over this coast, mainly for miners with small claims of their own.

There is a regular arrastra mill business at Dos Cabezas, Arizona, owned by "Arrastra" Johnson and E. F. Foster, a description of which will interest many readers. The mill consists of 16 horse power engine and 8x8 Dodge rock breaker and four arrastras. The arrastras are each 9 feet 6 inches in diameter, and when the bottoms are new are 8 inches deep, and on each arrastra is a pulley 8 feet in diameter and run by a 6 inch belt. All four arrastra belts run on one upright pulley that makes 3 revolutions to 1 revolution of the arrastras; and the upright pulley is driven by spur and bevel gear.

The engine makes 160 revolutions, the pulley that drives the spur wheel 135 revolutions, the upright pulley 27 revolutions and each arrastra 9 revolutions per minute. The mill runs so smoothly that one outside of the mill can hardly hear the mill run, and with 15 pounds of steam the engine can run the four arrastras, and grind 5 tons of hard gold quartz in 24 hours. When the rock breaker is working about 30 pounds of steam are used; only one cord of wood is used in 24 hours.

Each arrastra runs 1,250 pounds of ore per batch, and two batches in twenty-four hours. After the ore has been ground four hours the quicksilver is put in. More quicksilver is needed at the beginning of a run than afterwards, and too much quicksilver is almost as bad as too little. Every batch must be prospected to see how much is needed, for some kinds of ore will, where the batch is thick, raise all the loose quicksilver and the amalgam will remain in the crevices, so that when too much quicksilver has been put in once the next batch will not need so much, or probably none at all. Other kinds of ore will not raise the quicksilver at all, so that every batch must receive just enough to amalgamate the gold the ore contains, usually about four ounces of quicksilver are used to one ounce of gold.

After the ore has been ground nine hours it is ready to thin up, and just enough water is added to the batch to settle the sand a little and then run till the sand is ground, when the batch is ready to run off. By this plan all the gold is amalgamated and settled and caught in the crevices. One of the arrastras is arranged so that silver rock can be run; it is connected to the boiler by one-half inch steam pipe and silver ore can be worked to as high a percentage in this arrastra as in any other pan. The steam pipe and cover for the arrastra cost but a trifle. A drag of iron of about 200 weight helps to grind and also helps the amalgamation.

Electric Light in Arizona.

EDITORS PRESS:—The business of electric lighting seems to be making progress in this Territory, both for public and private use. Organizations having recently been perfected in Tucson, Phoenix and Prescott, under franchises granted by the Brush Electric Light Company of Cleveland, Ohio, and the Swan Incandescent Electric Light Company of New York.

A Brush-Swan Electric Light Company was incorporated here a few days since, with a capital of \$50,000, comprising some of the leading citizens of Prescott. The Howard Smelter and Mining Co., the United Verde Mining Co. and the Conger Mill and Mining Co. are about to adopt the Brush Light for the illumination of their works. It is said that other places are considering favorably these combined Brush and Swan lights.

B. W. CROWELL.
Prescott, June 7th, 1883.

THE surveyors on the Oregon and California extension, from Corvallis to the junction, are still engaged in running preliminary lines. They are now between Monroe, Oregon, and the junction. In another week they will be ready for locating, when grading can be commenced.

Reduction Works.

The establishment of smelting works, ore samplers and mills at various points along railroad routes is one of the industries now being inaugurated which is destined to work great good to the mining interests. There are many localities where men have been long at work where their efforts have been greatly retarded by lack of means of reduction for their ores. Miners in small camps have been unable to work their ores to advantage, and have left mines idle which would pay good profits. Custom mills with no competition and no camps, when men could go nowhere else, have been apt to get most of the yield of the work, leaving the miners out in the cold.

The fact of there being a market for ores in any region is greatly to its advantage. Men of limited means, with an opportunity of disposing of their ores, can do profitable work where heretofore they have struggled along for years. Capitalists are seeing that there is a chance for investment in these works and a chance also of getting hold of good claims at reasonable prices. We hear of sampling works being contemplated at several points where ore purchasers and miners will be accommodated. The mining community will be greatly benefitted when such establishments become still more numerous. An opportunity to come into the market with ores is all many of the miners want, and thousands of new mines will be opened and old ones more thoroughly developed.

Mining Surveys.

It has been officially decided that applicants for mining patents are not bound to note on the plat, and in field-note conflicts with unofficial surveys. And, moreover, failure to comply with the regulations of the Surveyor-General does not necessarily annul a survey unless the same fails to comply with the law. In a recent case the plat and field notes of a survey failed to show a conflict with another mine, although the latter had been previously surveyed, and they neglected even to indicate a thirty feet tunnel lying within the limits of the claim. By reasons of the omissions the man who patented was unable to tell by the plat and field notes that the claim in any manner conflicted.

The Commissioner of the General Land Office rules that there is nothing in the regulations that would require a deputy to note conflicting surveys other than those made under direction of the Surveyor-General, and this prior survey was a private one. The existence of such a survey in the present instance may have been well known, and it could therefore have been readily noted, but such is not always the case, and to require that every survey, whether of record or not, shall be noted would in many cases work unnecessary hardship, particularly if a failure to recognize such survey was held to invalidate the notice given to adverse claimants.

The Surveyor-General may make regulations for the guidance of his deputies in the performance of their work, but a failure to comply therewith does not necessarily annul a survey unless the same fails to conform to the law.

The Commissioner thinks the published notices in this case were sufficient to provoke inquiry, and have owners hunt the matter of conflict up. That is what publication is for. It was admitted the published and posted notices were read, but for some reason no protest was made at the proper time.

The Secretary of the Interior has directed a recognition of mining claims of settlers upon the public lands in Montana ceded by the Crow Indians under agreement made June 12, 1880, and ratified by Congress April 12, 1882. The Secretary holds that these lands, being ceded by definite boundaries, become public lands upon the date of the approval of that act of ratification, and from that date the legal rights of settlers and claimants took effect.

A NOVEL BANTER.—A Truckee wood-chopper throws his gauntlet in the face of all who can swing an ax scientifically, as follows: "I hereby challenge any man on the Pacific Coast to cut logs for ten hours, for from \$100 to \$200 a side, the match to take place in three weeks from the signing of articles, and to be within ten miles of Truckee."

A 10-stamp custom mill is soon to be erected at Clinton by some Bodie gentlemen, to work the ores from the Silverado and other mines that have ore in their dumps. The mill will be hauled from Bodie.

The Campbell Process.

A New Method for Treating Refractory Ores.

Of metallurgical processes on this coast we have had a good many; and as these processes have been numerous, so also have they been varied in kind, having been made up of the good, bad and the indifferent. We have had the well meaning but ignorant empiric, essaying a business for which he was but little fitted, either by education or experience; the Fryer fiasco furnishing a notable example of this kind. Then we have had the scientific fraud, the man Tichnor standing pre-eminent as the representative of the purely bogus. But while some few adventurers have so sought to impose their worthless or fraudulent devices on the mining public a much larger number of honest and capable experimenters have entered the field, and by their well directed and persevering efforts greatly advanced the business of practical metallurgy. We have only to recur to the early history of ore crushing on this coast to appreciate the gains that have been made in this department of mining. What would be thought of the man now who should undertake to pulverize gold-bearing quartz with an old fashioned bark mill? And yet the writer was witness to just such an attempt made in this city years ago, and that by a man who was then considered *au fait* at the business. The mill did not grind up much quartz, but we have a distinct recollection that the quartz ground up the mill in a very short time. While this incident illustrates how we have progressed from barbarism to enlightenment in this arm of the service, it may safely be said that the chemistry and metallurgy of the business have more than kept pace with its mechanical advancement. But, while we have accomplished so much, and this Campbell process promises a great deal, persistent and intelligent experiment of this kind lies in the direction of one of our sorest needs.

It is every year becoming more and more apparent that our most productive, permanent and profitable mines are to consist of those yielding large quantities of rebellious ores. Incalculable and to the unmined incredible are our resources in this respect. They abound in nearly every district throughout the vast expanse of our mineral domain. They stretch almost continuously along both slopes of the Sierra Nevada for a distance of nearly 400 miles. Even in the Coast Range we have immense and valuable deposits of this kind; and what we have in California and Nevada is duplicated in Colorado, Montana and New Mexico and largely obtains in all the other States and Territories of the Far West. Rich lodes without number remain everywhere untouched, because of our inability to successfully handle these intractable ores, this being the obstacle on which hundreds of, what would otherwise have proved prosperous enterprises, have been wrecked. We have said this much by way of showing the important bearing that any improvement in the treatment of our obstinate ores must have on the mining industries of this coast.

The Contriver and His Contrivance—Getting to Work.

The process we are about to describe is the invention of Dr. John Campbell, of New York city, who had the patentable features of it secured by letters patent two years ago. Since that date a good deal of time has been spent by him and his assistants in perfecting the manipulations and appliances of the method and testing its merits in a practical way. Hence, the delay in announcing this new device to the public, the inventor being unwilling that it should attain any notoriety until he had corrected some minor defects and rendered the whole as perfect as possible. To the performance of this task Dr. Campbell brought large scientific acquirements and experience in the treatment of difficult ores, insuring to him the advantages that result from theory and practice combined. From the knowledge so obtained, this student and worker has evolved the plan about to be described for working non-amalgamating and non-smelting ores. Owing to the natural and very proper distrust with which all new methods are apt to be regarded at first, some difficulty was for a time experienced in getting enough ore to keep the works steadily employed, this affording further cause for interruptions and delays.

Apparatus and Various Manipulations.
The Campbell process is operated on this

coast by the Pacific Mining and Reducing Co., who have their works in this city, at No. 410 Ritch street, the site being in close proximity to the freight depot of the Central Pacific and the Southern Pacific railroad companies. In the building which contains the plant, a plain but spacious and commodious structure, has been concentrated everything pertaining to the business. Here are the roasting furnace, condensing chambers, lead bath, smelter, etc. Entering the building from Ritch street, the visitor passes through a large apartment filled with sacks and piles of ore to the rear, where are situated a Dodge rock breaker and a Dodge pulverizer, which crush the ore sufficiently fine to pass through a twenty mesh screen. Near by are located the boiler and engine, the latter having ample power for driving all the machinery connected with the establishment. The ore after being crushed to the above fineness is passed through a hopper to an elevator, which carries it up and discharges it into a funnel at the top of the roasting furnace, a stack six feet in diameter and twenty-four feet high, made of heavy boiler iron and lined with fire-brick. As the ore from the funnel dropping by its own weight enters the furnace it is struck by a steam exhaust, which imparts to it a rotary motion, causing it to spread out evenly and fill the interior of the tube.

Two apertures at the bottom of the furnace, on opposite sides, are entered, each by an iron nozzle, through which is kept up a constant flow of

Crude Petroleum.

Being fired by the contrivance known as the Parson & Northey hydro-carbon injector, the flame from the burning fluid is driven into and up the furnace, creating an intense heat. The falling ore, retarded in its descent by its swirling motion and the upward current of hot air, is subjected to a thorough roasting before it reaches the pit prepared for its reception at the bottom of the furnace. This petroleum, kept in a large cask elevated above and at some distance from the furnace, to which it is fed through a connecting pipe, proves to be a cheap and otherwise serviceable fuel, costing but six cents per gallon, from four to six gallons sufficing, on an average, to roast one ton of ore. When once the furnace is brought to a high temperature, not over two or three gallons of oil are required for roasting ores that carry a large percentage of sulphur, as that mineral, when heated to the point of combustion, becomes itself a fuel, greatly assisting to feed the flames.

The smoke, fumes and dust from the roasting furnace are taken in on the overturn and carried down into and through a series of

Condensing Chambers.

Five in number, after passing along which the residue escapes through the main smoke stack. The last chamber in this series is partially filled with water, which absorbs any noxious gases coming in contact with it. The dust collected and the vapors condensed in these chambers contains always more or less gold and silver of atomic fineness, a considerable saving of the precious metals being effected through their employment. The arrest of these gases, fumes and smoke in this manner, besides the gain mentioned, serves to relieve the premises from what might otherwise prove a source of ill health and discomfort.

The ore, which in its passage through the flames becomes almost wholly desulphurized, drops into a brick inclosure beneath the furnace, whence it is hauled out on a cooling floor. Here such amount of iron as may be necessary for fluxing is added, after which it is removed to another apartment containing

The Lead Bath and Plunger.

The most novel, as well as noticeable feature of the new process, and which may be described as an oblong-nearly rectangular iron vessel, or receiver, inclosed on all sides and capable of containing 4,000 pounds gallons or more of melted lead. Projecting upwards from one side of this vessel, near the bottom, is an iron pipe ten inches in diameter and open at the top. This vessel stands over an oven, which being heated with charcoal brings its contents up to the proper temperature, and so maintains them while work is going on. From one and a half to two tons of lead having been placed in the bath, or receiver, fire is applied in the oven beneath and the metal brought into a molten state. This done, a quantity of ore is thrown into the iron pipe, and by means of a pestle-

shaped plunger that works up and down in the latter, is forced through the mass of molten lead, the greater buoyancy of the ore bringing it speedily to the surface. In its passage through the lead the ore takes on from thirty to forty per cent of that metal. Coming on top and there remaining, the dry ore so mixed mechanically with lead is taken up on a shovel and removed from the bath through an opening on its upper side. Thrown in a heap, the heated mass is cooled with a spray of water, after which it is weighed and passed into the smelter, the quantity of lime required for fluxing, determined also by weighing, having previously been added. Charging the ore in this manner with lead converts an otherwise non-smelting into a smelting ore, in which condition it readily takes up the silver and gold. The lead is not here used instead of quicksilver for amalgamating the precious metals, but as an agent for promoting smelting.

The Smelter Here in Use

Is a water jacket furnace of about twenty tons daily capacity—fuel, English selected or patent prepared coke, though it is thought a mixture of this with common gas coke could be used to advantage. In localities where coke could not

grade and thereby save cost in transportation and refining. As this procedure can be carried on indefinitely, it is possible to enrich the bullion to almost any desired degree, it being the practice of the company to run it up to a value of about \$3,000 per ton. In districts far removed from railroads or other cheap means of transportation it might be found economical to grade the bullion up to five or even ten times this value. The loss of lead is inconsiderable, amounting to not more than four or five percent to the ton of ore treated, such loss varying with the conditions of the ore and furnace. Eventually a good deal of the lead so temporarily disappearing is recovered.

Recapitulating the Strong Points.

As this process has now passed through its experimental stages, during which it was subjected to the most crucial tests, some of which suggested important alterations and amendments, it is possible to speak of the results reached by it with a good degree of confidence. Summarizing what seem to be its more patent advantages, as explained by the managers, the following points are presented:

1st. The item of cheapness; the managers stating that ores of the most base and obstinate

ing too little lead for smelting, and too much for amalgamation.

4th. Uniformity and certainty of results: Be the ores what they may, the outcome of the Campbell process varies but little. The ore to be reduced having been carefully sampled and assayed the product can be estimated with great closeness beforehand.

5th. Simplicity: As this process is without eccentricities, so are its manipulations few and easily understood. Any good assayer or practical metallurgist can master all there is about it in a very short time, care and skill rather than great scientific knowledge being essential on the part of those charged with the general supervision of the business. A point requiring much care is the addition of the proper fluxes, to ascertain which, frequent assays of the ore become necessary.

The Campbell process has been examined and its workings witnessed by a number of our leading mine owners, millmen and metallurgists, who regard it with favor. The course pursued by Dr. Campbell of quietly going on and perfecting his process, instead of seeking to prematurely advertise its merits, as has been too much the practice with this class of inventors, is one to be commended. Besides the establishment in this city, similar works have been put up and are now ready for operations at Idaho Springs, in the State of Colorado, the prospect being that many others will soon be erected at different points throughout our mining States and Territories.

The general office of the Pacific Mining and Reducing Company is at 413 California street, San Francisco; officers John D. La Monte, President; James W. Burling, Secretary; John Campbell, General Manager; George F. Beardsley, Assayer and Metallurgist.

A New Barley Crusher.

We give an engraving on this page, of a new barley crusher, now offered to the public by the inventors and manufacturers, Best and Althouse, of 614 Broadway, Oakland. This crusher is constructed on new principles and is different from any other grinding machine now in use. It has an iron frame, weighs 1500 pounds, and has three rolls; one nine inches in diameter, and two rolls, each five inches in diameter. The two small rolls work against the large one, and grain passes through between two sets of rolls and is crushed by gradual reduction. All the rolls have an end movement, and this end movement causes the faces of the rolls to be always moving when crushing. Thus the machine combines four principles of grinding, while there are but two used in the ordinary roll system of grinding, viz: The crushing and the differential motion of the rolls. The two new features that have never been used before, are: First.—the grain passes through two sets of rolls. Second.—the end movement of rolls.

The inventors assure us that this machine can be attached to the engine of a thrashing machine in the field and grind the grain as it is thrashed, at the rate of fifty barrels of flour per day; or at the same time it can chop from forty to fifty tons of barley. They guarantee this machine to be superior to the best buhrs or rolls manufactured, and that it will do double the amount of work that the best make of French buhrs will do. It does not require half the power they use. It makes No. 1 Graham flour. The rolls never get dull or want sharpening.

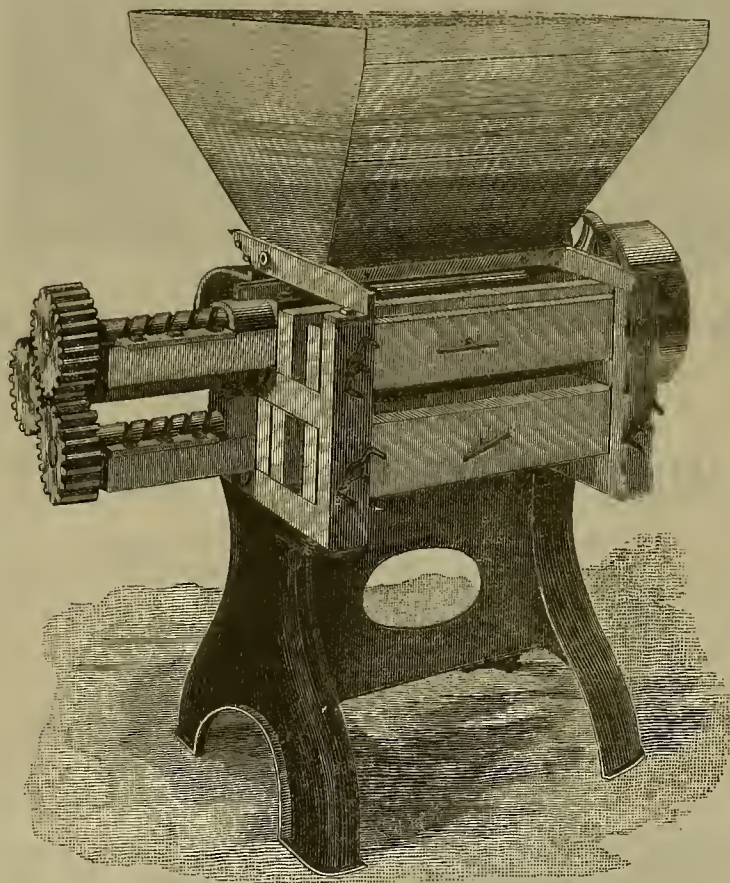
A profitable mine yields more business and more comforts to the surrounding region than anything else can. It makes work for miners, lumbermen, wood and coal and iron men; the merchant and the farmer alike rejoice at it, and the more it produces the more prosperous every other business is, for it makes work and it absorbs materials as nothing else does, and the greater its production the greater is the demand for earth's necessities and luxuries.

"When a mining claim is abandoned subsequent to publication and period to entry and payment, a case should be presented in which the executive department should be compelled to take jurisdiction, because the law under the state of facts allows the abandoned land to be again located by any qualified person in the same manner as if no location of the same had been made and makes no provision for the determination elsewhere of any question or controversy arising out of this class of conflicting claims."

"The fact that large expenditures have been at some prior period made upon a mining claim does not excuse the claimant from the necessity of complying with the law in making annual improvements or performing annual labor."

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A PERMANENT restoration of exhausted and worn-out functions follow the use of Brown's Iron Bitters.



THE BEST & ALTHOUSE BARLEY CRUSHER.

well be obtained charcoal might, of course, be made to answer for fuel. A large iron pipe receiving the smoke, dust and fumes from the smelter carries them over and discharges them into the line of condensers connected with the desulphurizing furnace, thereby making these arrangements for avoiding waste and rendering innocuous what would otherwise become a standing nuisance, very complete. The bottom of this smelter forms a huge crucible, into which the molten bullion settling is there retained at a fixed level, with the slag on top. This bullion, under such arrangement, flows out in a small but constant stream into an iron kettle, whence it is dipped into molds, forming pigs of about eighty pounds each. The slag, as often as there may be occasion, is drawn off and run into conical-shaped iron pots. It contains never any appreciable quantity of gold or silver, the most careful assay failing to detect in it more than a trace of either. Any copper that it contains is recovered in the shape of a button at the apex of the cone, from which it can readily be detached with a hammer.

Another Noteworthy Peculiarity

Of the Campbell process consists in the plan of returning this lead bullion and passing it repeatedly through the lead bath and smelter every time in connection with a fresh batch of ore, each of which imparts to it an additional quantity of the precious metals, the object of this being to bring the bullion up to a high

kind may be worked by the method described, at the average cost of less than \$8 per ton.

2d. Effectiveness. We are told that the precious metals contained in any ore, however refractory, may be extracted to within three or four per cent of results obtained by fire assay, and generally somewhat closer. As evidence of its capabilities in this respect, it may be stated that the works of the company are now and for some time past have been running on ore from the Manzanita Mine, situated on the easterly slope of the Coast Range, in Colusa county. This ore, as rebellious, perhaps, as any in nature, and which had been given up as wholly intractable, after trial by the Swansey, Newark, Selby and other first-class metallurgical establishments, seems to surrender its gold under the Campbell process, with the greatest readiness. As this ore carries, on an average, gold to the value of \$60 per ton, it can be reduced at these works with large profit, the cost of mining, transportation and treatment amounting to less than \$12 per ton. The Manzanita mine is said to contain a large body of this high grade but exceedingly obstinate ore. Lots of ore from other mines, distinguished for their baseness, have shown themselves docile when treated by this process.

3d. Adaptability to the treatment of a large school of ores incapable of being successfully handled by other methods, such as ores carry-

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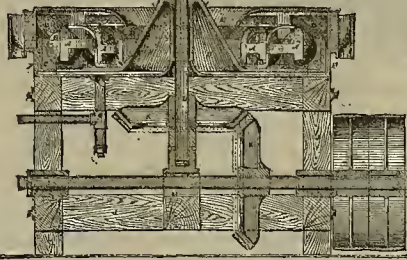
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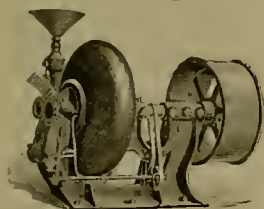
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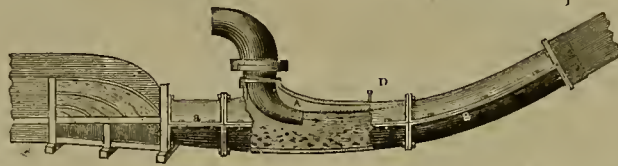
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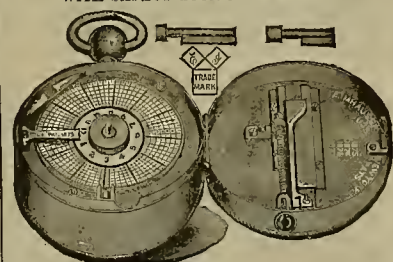
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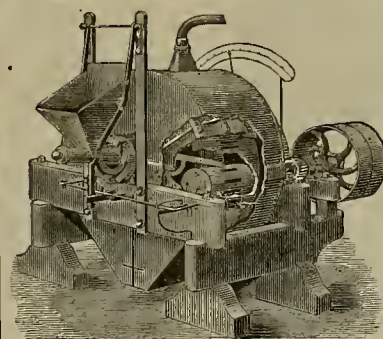
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING JUNE 5, 1883.

278,675.—AGRICULTURAL MACHINE.—John Bachelder, Napa, Cal.
278,890.—FRUIT DRIER.—C. A. Curran, Albany, Oregon.

278,996.—MACHINE FOR WETTING GRAIN.—John Miller, Milton, Oregon.
278,225.—GANG AND SULKY PLOW.—Phillip Moore, Portland, Oregon.

279,012.—FEEDING STRAW AS FUEL TO FURNACES.—W. S. Prosser, Auburn, Cal.

279,031.—CRAVAT SUPPORTER.—Frederick Smiley, S. F.

278,836.—TIRE UPSETTER.—William Valentine, Redding, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

TUCKER ATTACHMENT FOR SEWING MACHINES.—Alfred A. Fisher and Albert Hart, S. F. No. 278,422. Dated May 29, 1883. The improvements consist generally in the arrangement of parts and their construction, having in view the provision of a tucker attachment more nearly approaching perfection than the machine previously patented for the same purpose by these inventors. They consist particularly in a novel means of adjusting the base plate and the lower or under guard, and in the particular construction of said guard and its under-lying tuck securing plate; also in a novel means for regulating the width of the tuck guiding slot and in a novel adjustable tuck guard or support within the slot; also in a novel means for adjusting the upper guard, and in adjustable attachments thereto for guiding the goods to the tucker, and in the means by which this is accomplished.

ADJUSTABLE COUPLING FOR HARNESS.—Louis Wartenberg, Anaheim, Los Angeles county. No. 274,474. Dated May 29, 1883. This adjusting coupling for harness is specially adapted for the links or connections by which the tug is attached to the whiffletree. It consists of a screw turning in a nut in the link, to which the end of the screw is secured, said screw having a swivel connected with its opposite end, to which the coupling hook or bar is connected.

CRAVAT SUPPORTER.—Frederick Smiley, S. F. No. 279,031. Dated June 5, 1883. This invention relates to a new and useful cravat supporter, the object of which is to conveniently and effectively secure the cravat to the collar button. The invention consists in a metal loop hinged to the lower back edge of the stiffener, and having certain spring wires within and guarded by it, to form with its head a means for grasping the shank of the button.

TIRE UPSETTER.—Wm. Valentine, Redding, Shasta Co., Cal. No. 278,836. Dated June 5, 1883. This invention relates to a new and useful tire upsetter, and it consists in a stationary block having a fixed and a movable jaw, and sliding block having similar jaws, though oppositely placed, and an intervening lever so connected with the movable jaws that by its movement in one direction it separates the sliding from the stationary block after swinging open the movable jaws, and by its movement in the reverse direction it draws the sliding block with its jaws, the stationary block having previously closed the movable jaws. The object of this invention is, broadly, to shrink, or, as it is commonly called, "upset" tires. This is a well known operation, consisting in gripping the tire in two places and forcing the gripping devices together, whereby the tire is thickened, and consequently shortened to render it smaller in diameter. The particular object of this invention is to provide a convenient and effective device for this purpose, one in which the entire operation of gripping the tire and shrinking it is performed by the movement of a single lever.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

H. W. McCREW—Santa Clara county.
M. C. OWEN—Santa Cruz county.
J. A. WRIGHT—Merced, Tulare and Kern counties.
JARED C. HOLE—California.
B. W. CROWELL—Arizona Territory.
N. H. HARRISON—Plumas county.
M. H. JOSEPH—Fresno, Nev.
I. M. LINDY—Los Angeles, San Bernardino and San Diego counties.
A. C. KNOX—Oregon and Washington Ter.
F. W. STRATTON—Sierra and Yuba counties.
J. J. BARTHALE—Yolo county.
JAMES W. BOYER—Sacramento county.

At Sweetwater the Summers mine has 30 men at work.

Wrought Iron Pulleys.

There is now in this city an establishment for the manufacture of wrought iron pulleys, where they have just completed the largest wrought iron pulley ever made. It is ninety-six inches in diameter with fifty inch face. It was made for Starr's mill, Vallejo, for which they have already manufactured 500 similar pulleys of smaller diameter. Messrs. Clot & Meese, of the Reliance Machine Works, 129 and 131 Fremont street, who make these Medart patent pulleys on this coast, have facilities for making fifty pulleys a day. They have shown commendable enterprise in acquiring the right for this patent of the coast, and are reaping their reward. They supply the machine shops of this city. They have a contract now on hand to supply the large flour mill, about to be erected in Portland, Oregon, with over 900 pulleys of various sizes.

The objections to cast pulleys in common use, are, that they are apt to be badly balanced and unduly heavy and weak. In casting such pulleys the rim chills in advance of the center, which causes the parts to be strained and weakened, and the rim is liable to be weakened. The wrought rim pulleys combine the minimum weight and the maximum strength. The arms of the pulley are straight, and their number is increased. The smaller sizes have six, the medium eight, and the larger ten or twelve arms. The rim, owing to the nature of the material, is much stronger than the cast rim. The construction is such that this style of pulley is well balanced for all speeds. The center of gravity of a completed pulley, made by this process, is made to coincide more absolutely with its geometrical center than has been possible under the ordinary methods of manufacture. The wrought iron face is denser than the cast, and being ground smooth it greatly lessens the wear on belting. There is no danger of breakage in handling when shipped loose, which saves freight. The rims are cold rolled, either crowning or straight. The process of manufacture, as well as the product and machinery, are protected by patents.

Government Bullion Statistics.

Although only a very brief abstract of the report of the Director of the Mint has been telegraphed to this coast, there is great dissatisfaction at the figures of bullion product referring to this State. The yield is given as a total several millions below that which Mr. Valentine, of Wells, Fargo & Co.'s Express, has assigned California, and his figures have always been considered reliable. If Mr. Burchard is reported correctly he has made a very bad blunder in Nevada county figures. He places that county's yield at some \$360,000. The fact is that the Idaho mine alone yielded \$566,000, and paid \$263,500 in dividends. The North Bloomfield mine yielded \$386,146, and the Milton, \$416,044. These mines foot up alone a million and a quarter. It seems likely from this that the director is misrepresented by the telegraphed figures, as it does not seem possible such a stupid blunder could be made.

Still, what are we to say of Sierra county, as referred to in the following paragraph from the *Sierra Tribune*: "Director Burchard, of the Mint, estimates the production of Sierra county during that time at \$110,000! This is about as near right as the Mint statistics generally are. The gold production of the Rainbow Mine alone last year was about \$200,000, and the Sierra Buttes yielded at least \$100,000. The total production of the county for 1882 was probably at least \$500,000."

It is apparent that the statistics of production are placed too low here at any rate. The truth of the matter is that the Mint Director's Bureau has more of a political flavor about it than is good for the results. When men who collect the material for the chiefs' report are selected for political reasons rather than for special fitness, good work cannot be expected.

The publication of erroneous statistics is much worse than no publication at all. People always read these reports as "blue books" and base their opinions on them. When California is credited with twenty-five per cent less than the real yield, corresponding injury is done to her mineral resources. If the Government is going to give us statistics, it ought to have them properly collected and have them correct. The figures as published, do California great injustice.

Rogers' District, Arizona.

[Written for the PRESS by C. H. AARON.]

Northward, a little easterly from Pinal, over rolling foothills formed of conglomerate and covered with the gravelly detritus thereof, consisting largely of quartz, along a dry wash cut through the same conglomerate, over a low ridge and into a large canyon, the bed of which for some distance consists of a hard blue rock, thickly veined with adherent barren white quartz, up "a very high hill" at its head, in which mica, schist and barren quartz abound, over the crest and along a ridge of coarse porphyritic granite, covered with "brush" and Spanish daggers, and intersected by a prominent but said to be a barren quartz ledge, down again into a pretty canyon well wooded with oak and juniper, with plenty of grass, but at this season no running water, brings the traveler to the camp at Rogers' district.

The camp consists of three rough shanties, a tent or two, and a small smelting furnace, built in Mexican style of adobes. A rudely constructed horse power machine works the blower. The mines are to the left, looking northward, in a continuation of the ridge spoken of which divides the watersheds of the Gila and Salt rivers. The formation here is syenite chiefly. The veins are small and well defined, carrying rich ore in lumps and bunches among a mass of vein matter. Silver glauconite, antimonial galena, lead carbonate, azurite and malachite, copper arsenate, pyrites, ochreous matter of various shades, anglesites or, as the miners called it, "anthracite of lead," quartz and calcite are among the contained minerals. A good deal is said about "chlorides" but none was observed. The miners usually call any oxidized or ochreous ores "chloride ores," while the true silver chloride is known among them as horn silver only.

The principal mines were discovered seven years ago, and they have been worked to a trifling extent ever since. A few carloads of selected ore have been exported, but the expense consumed the greater part of the proceeds. Some working mechanics from Pinal have recently put up the little smelter, which is now just beginning to turn out bullion. As the ore is well adapted to smelting, it is hoped that the miners, who have shown great pluck and perseverance, will now be enabled to demonstrate the value of their properties, which is only open to question on the score of continuity of the veins and quantity of ore, the quality being quite satisfactory.

The district is well wooded and fairly watered. The timber is chiefly oak and juniper quite near the mines, but at the distance of about two miles is a pinery, from which an abundance of lumber and nine timbers can be got in the future, should the requirements of the camp justify the erection of a sawmill. The eastern slopes in particular are covered with a dense growth of brush, which makes prospecting difficult. Of course cactus is not wanting, and Spanish daggers bristle on all sides. In the canyons, locust, walnuts and cherries grow; the soil in many spots being rich and deep. The manzanita reminds one of California, and accounts for the alleged presence of bears, while deer, rabbits and quails abound. Peccaries are also found, if not here at least a few miles away.

Rogers' district is fifteen miles from Pinal by the route described. A better entrance to and exit from the district can be had to the westward, over a comparatively low pass leading to a canyon which debouches at a point on the Casa Grande road, only forty-five miles from the railroad; and this will be the route should the camps flourish. It passes through Cole district, in which are some very promising prospects.

It is very fortunate for the miners in this section that a rather high mountain intervenes between it and Pinal, otherwise the purveyors of wood to the Silver King mills would soon make that commodity very scarce here. As it is, they have nearly reached the summit on the southern side, and may possibly yet cross over under the stimulus of enhancing value, as any desired grade can be had by means of winding trails over which a train of "burros" can pass.

On one of the mountains bordering the little valley of Rogers' district on the east, are said to be some ruins of ancient dwellings. The miners wonder what could have induced the residence in such a place, of a people who knew enough to build such houses, and did not know enough to dig for silver. It is suggested that game and wild fruit may have been the object.

DESTRUCTIVE FUNGUS.—Dr. H. W. Harkness, of the California Academy of Sciences, furnishes us with the following note: "The fungus which has so generally affected the leaves of the apricot and cherry is the *Phyllosticta circumscissus* (Cook). The fungus destroys a limited portion of the leaf, which it attacks when the dead part shrinks away from the living, and tearing itself loose from the healthy portion of the leaf, falls to the ground; hence the holes. In South Australia, where it abounds, it is called the 'shot hole fungus.'"

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walked with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

Enlarged Issues of the Mining and Scientific Press.

It is the intention of the publishers of this journal to spare no enterprise in advancing the future interests of its readers by all reasonable and practicable methods. Among other advances, we contemplate issuing soon several extra sized sheets, especially devoted to different important localities, commencing with the

Territory of Alaska.

The contents of this issue will include a well prepared map nearly the size of two pages of the PRESS; views of several seaports, towns, scenery and other objects of interest. This is a new land, concerning which new information is coming to hand, and its resources are just being developed. Alaska is situated on our own coast, largely drawing her supplies from our own State, and will soon become of that importance to our community which will render it to our advantage to be well posted on all that pertains to the welfare and progress of our neighboring northmen. Our map will show the numerous water courses of Alaska, the means of water communication, the harbors, etc. We shall give a description of all the mining regions so far opened, and in fact such information as is available, and will be of general interest.

Other double editions will follow shortly after, which will be devoted to the special interests of other mining localities.

All these regions possess more or less interest for California and San Francisco. We ship goods of certain kinds from here, and, from a commercial point of view alone, our interests are mutual. Moreover, the advancement of these regions does good to the whole coast, in which we are all interested.

Persons who can contribute information of special or general interest to our readers for these various issues are solicited to send the same as early as possible. If miners will send us descriptions of their mines or camps we shall be very glad to receive them.

As we make this extra effort to advance the interests of all concerned in the places named, we ask that all who can, to favor our enterprise by making the matters more widely known, and the MINING AND SCIENTIFIC PRESS more extensively patronized. The mining literature of the world is comparatively limited. Miners and scientific men especially should be liberal to assist their helpers in a line of publication, which, at best, cannot be expected to be largely profitable while doing strict justice to the highest interests it represents.

The dates of issue of the proposed extra sheets may be varied, if circumstances should demand it, but due notice will be given.

FURNACE.—We had a call this week from Mr. Robert A. Nevin, of Silver Cliff, Colorado, the patentee of a valuable ore-roasting and chloridizing furnace. Mr. Nevin states that it has been in use at Navajo mine, in Tascara district, Nevada, and has resulted in a large saving to the Navajo. Mr. Nevin thinks of instituting suit for the infringement of his patent, unless a satisfactory settlement can be effected.

SECRETARY CHANDLER will advertise for sealed proposals for the purchase of two iron-clads, two iron and twenty-six wooden ships, which have been condemned by boards of inspectors as unfit for naval service. The following vessels now at Mare Island are included in the list: Benicia, Narragansett, Nyack, Saco, Tascara and Alaska.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times,) by turning a leaf.

Recent Contributions to the California State Mining Bureau.

[Furnished for publication in the MINING AND SCIENTIFIC PRESS by HENRY G. HARRIS, State Mineralogist.]

- [CONTINUED.]
1960. Mierulite. Near Red Hill, Butte county, Cal.
1961. Rock Specimen (undetermined) Red Hill, Butte county, Cal.
1962. Rock Specimen (undetermined) Red Hill, Butte county, Cal.
1963. Rock Specimen (undetermined) Red Hill, Butte county, Cal.
1964. Rich Silver Ore (large specimen) Golden mine, Calaveras district, San Bernardino county, Cal. Hon. John Duggett.
1965. Pyrolusite (Bis Oxide of Manganese) Hahn's ranch, twelve miles south of Guadalupe Quicksilver mine, Santa Clara county, Cal. E. F. Hahn.
1966. Limonite (Iron Ore, marked Copper Ore) Hahn's ranch, twelve miles south of Guadalupe Quicksilver mine, Santa Clara county, Cal. E. F. Hahn.
1967. Iron Ore, limonite. J. Z. Davis.
1968. Sulphur, Native. Munkel sulphur deposit, Esmeralda county, Nev. H. S. Durbin.
1969. Ore said to be Rich in Silver. Grigsby mine, Calaveras county, Cal. E. F. Grigsby.
1970. Strato of Soda. Cave in Calaveras district, San Bernardino county, Cal. W. B. Munkel.
1971. Scoriaeons Lava (Basalt) Teel's marsh, Esmeralda county, Nev. J. H. Crossman.
1972. Lava and Pseudomorphs. Santa Clara county, Cal. There is a chain of volcanic vents in the valley; the Guadalupe river winds through them; they rise but a few feet above the valley. E. A. T. Gallagher.
1973. Azurite. Blue Carbonate of Copper. Near Teel's Marsh, Esmeralda county, Nevada.
1974. Models (two specimens) of pitted and engraved Reinhold horns. Found in a cave in Perigord Dordogne, France. Described in "Primitive Man," Louis Figuier, folio 73 and figured folio 102 in the same work. Supposed to have been slaves of authority.
1975. Model of a Dagger of Reinhold Horn. The hilt carved like a reindeer. Original found in a cave in Perigord, Dordogne, France. (Figured folio 107, "Primitive Man," by Louis Figuier.)
1976. Model of a figure carved in Reinhold horn. Original found in a cave in Perigord, Dordogne, France.
1977. Model of a figure carved in Reinhold horn. Original found in a cave in Perigord, Dordogne, France.
1978. Model of a figure carved in Reinhold horn. Original found in a cave in Perigord, Dordogne, France.
1979. Model of a figure carved in Reinhold horn. Original found in a cave in Perigord, Dordogne, France.
1980. Figure carved on Reinhold horn. Original found in a cave in Perigord, Dordogne, France.
1981. Model of a figure carved in Reinhold horn. Original found in a cave in Perigord, Dordogne, France.
1982. Model of a figure carved in Reinhold horn. Original found in a cave in Perigord, Dordogne, France.
1983. Model of a dagger or bodkin. Original found in a cave in Perigord, Dordogne, France.
1984. Arsenite of Nickel. El Hundolito mountains and district, north of Winnemucca, Humboldt county, Nev.
1985. Chrysocolla. (Tungate) of Lime and Copper. Lower California, Mexico.
1986. Sand from a well in the Colorado desert, San Diego county, Cal. J. Z. Davis.
1987. Iron Ore (Hematite) Jackson, Amador county, Cal. I. Blakely.
1988. Whalebone from the Balena Mysticetus, Bowhead, or Great Polar whale, known by the name of Balen among the whalers. For description see "Marine Mammals of the Northwest Coast of North America," by Capt. Charles M. Scammon, published by John H. Curran, N. Y.
1989. Ammonites (fossil) Santa Fe district, Esmeralda county, Nevada. J. H. Crossman.
1990. Fossil Shells (undetermined) Santa Fe district, Esmeralda county, Nevada. J. H. Crossman.
1991. Fossil Shell. Ammonite (B. Roof of Centennial coal mine, Contra Costa county, Cal. E. W. Martin.
1992. Tourmaline—Santa Fe district, Esmeralda county, Nevada. J. H. Crossman.

Double Rates of Interest.

The following is a synopsis of the decision rendered by Judge Marks against double rates of interest charged on a mortgage note in the case of Oakland Bank of Savings vs. John Applegarth:

This action is brought by the plaintiff to foreclose a mortgage, made by the defendant to the plaintiff the 20th day of November, 1879, the security of a note for \$6,000, bearing interest at the rate of one and one-tenth per cent. per month, payable monthly in advance, and setting forth that in case of default of these payments, shall bear interest from the date of maturity at two per cent per month, compounding monthly, and shall then, at the option of the holder, become payable. The sum so due shall thereafter bear interest at the rate of two per cent per month, compounding monthly until paid.

The direct issues made by the pleadings and the main question before the Court are: 1st. What was the amount due the mortgage debt at the commencement of the action? 2d. Was the sum due plaintiff on the contract?

The opinion of the Court is that it cannot influence the latter contract and that Sec. 1,919 of the Civil Code places an express limitation on such contract. The Supreme Court, in bank, recently decided in the case of the Savings & Loan Society vs. Horton, that a claim charging the original rate of interest at the election of the security holders, was within the limit of Sec. 1,919 of the Civil Code, and consequently inoperative. It appears to the Court that the amount due plaintiff from defendant on the contract, on the 1st day of September, 1882, was \$6,383.29, less the amount to be legally deducted therefrom by defendant, as the mortgage tax on plaintiff's mortgage for the current year. That the defendant tendered the plaintiff the sum of \$6,344.55, which the plaintiff refused to accept, without any valid reason. The Court considers that Sec. 2,076 of the Civil Code of Procedure is conclusive as to the consequence of an unqualified refusal and which estoppes the plaintiff from taking anything from the defendant by virtue of action to foreclose the mortgage. According to these views, the Court on an examination of the law and evidence, it follows that the defendant is entitled to the equitable reposition of the Court, and is of opinion that relief awarded to the plaintiff should be substantially as recited by the defendant in his answer, that the same is true and the defendant is entitled to recover cost of this action. The tender of defendant on September 1st, of the full amount due, stopped the interest on the obligation.

The Court, holding from the evidence adduced and the law applicable, that the defendant is entitled to receive the sum of \$82.62, and the plaintiff the remainder of the money held by the Court in this action. Defendant is also entitled to a judgment in his favor for costs of this action.

Alpine's Mines.

Several mines have been worked during the past year in the county and some little prospecting done on what was considered favorable locations, with very encouraging results in some of the claims. The recent prospects struck leads us to believe that there yet remain rich mines within our border undeveloped, and that our county is not played out as a mining field as asserted by many. Our county labors under great disadvantages as against several other mining counties adjoining us. There seems to be a decided prejudice against Alpine by many, as a mining district, for the reason that so many have been deceived and defrauded by those doing a mining business in the county. They have passed judgment on our mining industries, without ever enquiring what was the cause of the failures. In the first place expenditures have been made on the surface, instead of opening up the mines, and a large staff of hangers-on have eaten up the funds of the stockholders, or used it in such a way as not to open up and develop a mine as it should be, or in useless and extravagant expenditures, and Alpine is blamed for her valueless mines. The time is not far distant in the future when capitalists may visit our section in search of, and to purchase mines. We want no booms. Open up your mining properties instead of trying to sell undeveloped claims for fancy prices; when purchasers come along be reasonable and willing to sell for the actual value of your mine, and not its prospective value. The time has passed for fancy prices, and the amount in sight as in other kinds of business, is the true value of mining properties. —Monitor-Aquas.

News in Brief.

The British underwriters are demanding additional premiums on vessels going to China, especially Frenchmen. The increase of piracy is feared.

A SOVEREIGN insurance policy has just been taken by a merchant of Huron, viz: The company insures the windows against cyclones, the risk being \$125.

The Chinese excursion and picnic to Coney Island, on Monday, was attended by 250 Chinese, chiefly members of the different Sunday schools.

In 1860 the population of Oakland to San Francisco represented a ratio of one to thirty-seven; in 1870, one to fifteen; in 1878, one to eight, and by the school census of 1883, one to six.

CAPTAIN EADS will sail for Europe on the 20th on business appertaining to the Tehuantepec Ship Railway. Captain Eads asserts confidently that at the end of five years ships will be carried on rails from one sea to the other.

At Hamburg a number of prominent shipping firms expressed sympathy with the prospect of a second Suez canal, and resolved to communicate with the British Committee with a view of eventual participation in the undertaking.

The track of the Northern Pacific railroad will be laid to Helena, Montana, in a few days, and the first through ticket from Helena and Butte to St. Paul will be sold to the highest bidder at auction. A lively competition is expected for the honor.

A DISPATCH from Dallas, Texas, says the cattle drive so far this season exceeds all expectations, as over 200,000 head have already passed over the trail that leads through Albany. This does not include more than half the cattle that have been driven from Texas.

REV. EDWARD EVERETT HALE proposes writing a history of the Pacific ocean and its shores. He has been collecting material for the work for forty years past. He will write a chapter on the discovery of California for the forthcoming history of the United States.

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Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

Seaton Gold Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Drytown, Amador county, California.

NOTICE. There are delinquent upon the following described stock, on account of Assessment No. 2, levied April 10, 1883, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Scott, E. A.	4	10	75
Warner, Alex.	5	10	75
Martin, A. Trustee	6	5,000	375 00
Martin, A. Trustee	7	5,000	375 00
Martin, A. Trustee	8	5,000	375 00
Martin, A. Trustee	9	5,000	375 00
Martin, A. Trustee	10	1,000	75 00
Martin, A. Trustee	11	1,000	75 00
Martin, A. Trustee	12	1,000	75 00
Martin, A. Trustee	13	1,000	75 00
Martin, A. Trustee	14	1,000	75 00
Martin, A. Trustee	15	1,000	75 00
Martin, A. Trustee	16	1,000	75 00
Martin, A. Trustee	17	1,000	75 00
Martin, A. Trustee	18	1,000	75 00
Martin, A. Trustee	19	1,000	75 00
Martin, A. Trustee	20	500	37 50
Martin, A. Trustee	21	500	37 50
Martin, A. Trustee	22	500	37 50
Martin, A. Trustee	23	500	37 50
Martin, A. Trustee	24	500	37 50
Martin, A. Trustee	25	500	37 50
Martin, A. Trustee	26	500	37 50
Martin, A. Trustee	27	500	37 50
Martin, A. Trustee	28	500	37 50
Martin, A. Trustee	29	500	37 50
Martin, A. Trustee	30	4,000	300 00
Martin, A. Trustee	31	300	22 50
Davis, John A.	32	300	22 50
Martin, A. Trustee	33	5,000	375 00
Martin, A. Trustee	34	5,000	375 00
Martin, A. Trustee	35	5,000	375 00
Martin, A. Trustee	36	4,900	367 50
Kellogg, G. W.	37	100	7 50
Martin, A. Trustee	38	5,000	375 00
Martin, A. Trustee	39	5,000	375 00
Martin, A. Trustee	40	5,000	375 00
Martin, A. Trustee	41	5,000	375 00
Martin, A. Trustee	42	5,000	375 00
Martin, A. Trustee	43	10,000	750 00
Fischer, Bertha P.	44	100	7 50
Corwall, P. B.	45	4,800	360 75

And in accordance with law, and an order of the Board of Directors, made on the 10th day of April, 1883, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at 528 California St., Room 6, San Francisco, Cal., on TUESDAY, the 5th day of June, 1883, at the hour of 1 o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expense of sale.

A. MARTIN, Secretary.

OFFICE—Room 6, 528 California St., San Francisco California.

POSTPONEMENT.

The above sale of delinquent stock is hereby postponed to THURSDAY, the 28th day of June, 1883, at 1 o'clock p. m., at the same place. By order of the Board of Directors.

A. MARTIN, Secretary.

San Francisco, June 6, 1883.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company.

San Francisco, June 4, 1883.

At a meeting of the Board of Directors of the above named company, held this day, a Dividend (No. 42) of twenty-five cents (25c) per share was declared, payable on FRIDAY, June 15, 1883, at the office of the company, room 19, No. 328 Montgomery Street, San Francisco, Cal. Transfer books will close June 9, 1883, at 3 p. m.

JOSEPH NASBI, Secretary.

MINING PARTNER WANTED.

A gentleman who is a graduate of Freiberg and has had experience in the mines on this coast, is desirous of forming a partnership with some one experienced in mining affairs, with a view to establishing works here. Having some capital he wishes to add it to what may be furnished by the partner, with the idea of forming a permanent mining and metallurgical business. A graduate of some mining school preferred.

Address "B. S."

Care of Editor "Mining and Scientific Press,"

252 Market St., San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, June 2, 1883.

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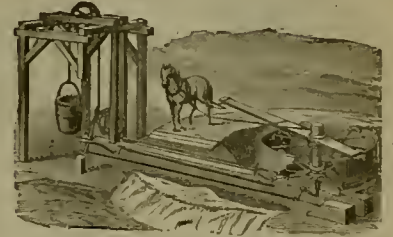
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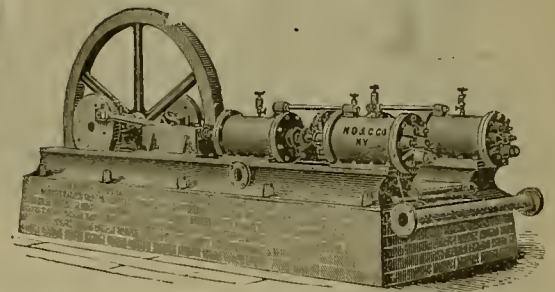
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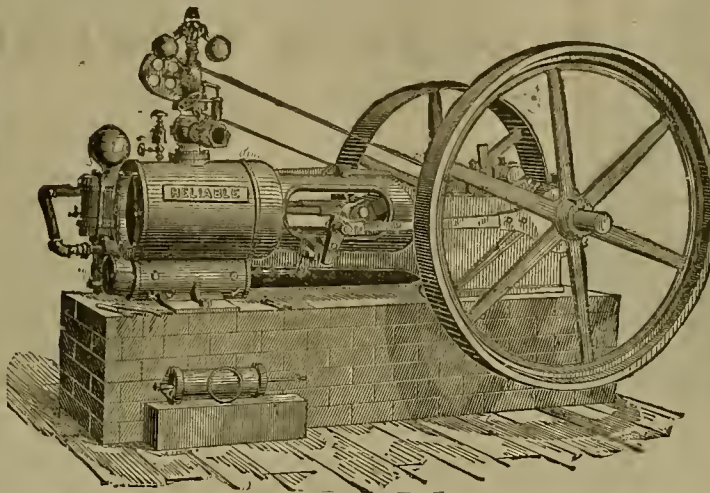
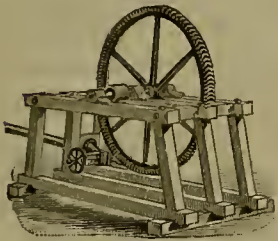
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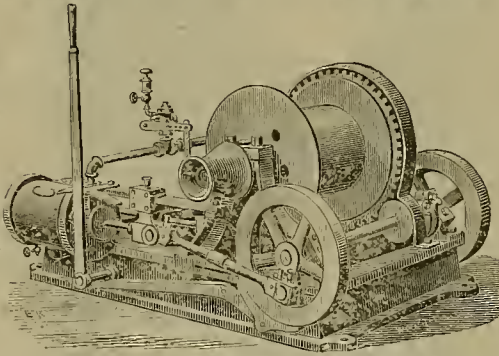
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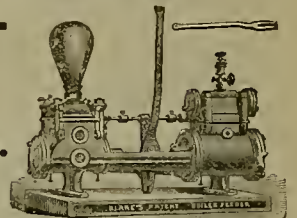
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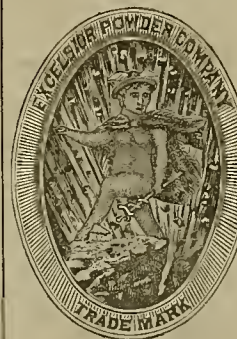
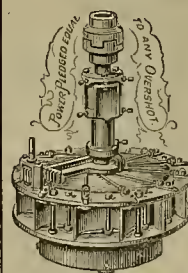
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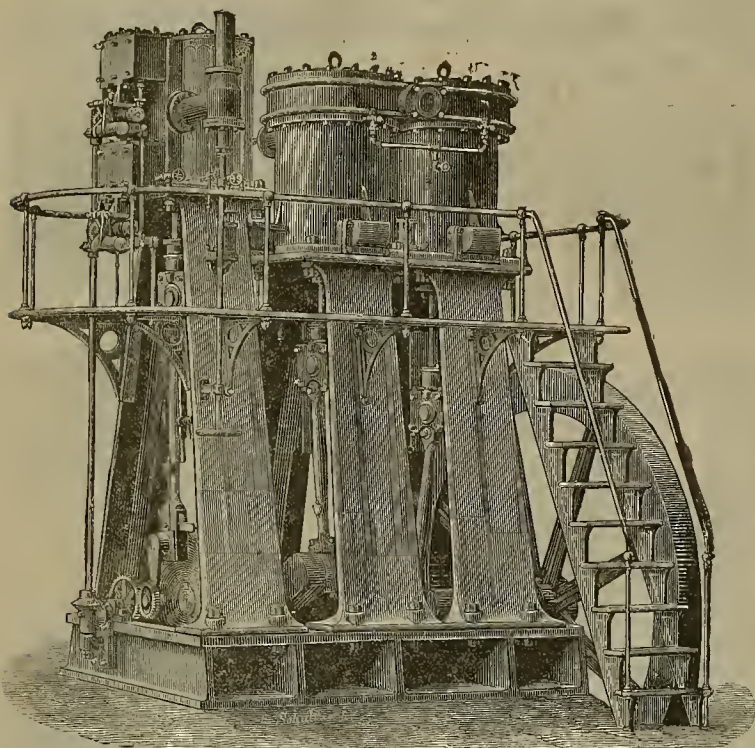
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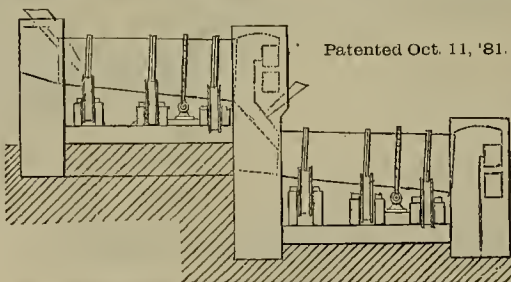
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News

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SAN FRANCISCO, SATURDAY, JUNE 23, 1883.

VOLUME XLVI
Number 25.

Timbering in Mines.—No. 14.

Special Form of Timbering.

A form of timbering is employed in France and described by Audre, that is deserving of special attention, inasmuch as it possesses very valuable qualities and is but little known in other countries. This form is capable of offering an enormous resistance; so great, indeed, as frequently to withstand the pressure when the walling has been completely crushed. It has been found to last three or four years in situations where the ordinary timbering has been destroyed in two or three months, and to have successfully resisted the destructive action of the "creep," when, in consequence of an accident or a strike, the mine has been closed for some time. These properties render the former valuable for the main roadways of a mine, and for use on those parts where the pressure is very great. As a suitable substitute for walling, the former offers, under such conditions, a very considerable degree of economy.

The two main features of this system are, first, the employment of struts to support the stanchions and the cap at the points where they have a tendency to yield; and, second, the use of longitudinal pieces to bind together the different sets of timbering.

The system will be understood from an inspection of the accompanying drawings, Fig. 1 of which represents a set as designed for a narrow roadway of a single line of rails. Fig. 2 is a sectional or side view. The principal timbering observed is of the ordinary construction, the peculiarity of the system lying wholly in the means employed to strengthen the structure. The timber used for the purpose is round, and of relatively small dimensions, the diameter being about three inches for narrow roadways, and about four inches for the ways intended for a double line of rails. It will be seen from the drawings that two uprights are placed inside the principal stanchions, and in contact with the latter throughout their length. These uprights are firmly set in the floor, and reach to about one-third of the height of the stanchions. Their upper ends are bird-mouthed, to receive the longitudinals, which are intended to bind the sets together. These longitudinals are merely placed end to end, and they are held in position by friction alone, no nails or other means of connection being used. The length of these pieces will be equal to the distance of the sets apart, center to center, or some multiple of that distance, and it is important that they all be of the same diameter. The distance of the sets, that is, each pair of stanchions with their cap, apart, is determined, of course, by the strength of the rock. Generally, in fairly strong rock, they may be placed at intervals of three feet from center to center, and in very weak and fissured rock at intervals of eighteen inches. In some cases it may be necessary to place them closer together. As it is impossible to estimate the strength of rock accurately, it may also become necessary to double the sets, that is, to place a new set between every two existing sets, after the first timbering has been completed. The dimensions of the pieces will likewise be determined by the same condition of strength in the rock. As the pieces furnished are rarely of equal size, the larger and small should be made to alternate so as to have the weaker set be-

tween two stronger ones. In some cases, economy of timber may be gained by thus alternating sets of different dimensions. It is desirable that the timber should be sent into the mine cut to the requisite length.

The similar longitudinal is placed in the middle of the cap, and supported by two struts abutting upon the longitudinals. The ends of these struts are bird-mouthed, like the upper ends of the uprights. Thus it will be seen that the stanchions and cap of the principal timbering are supported at those points at which they begin to yield, and that in consequence of the connection furnished by the longitudinals, a pressure occurring at one point is distributed over several sets of timbers. Thus the timber

is produced, capable of resisting an enormous pressure. It is obvious that this bracing may be applied to every set of timbers, to each alternate set, or to those portions only of the timbering of a level against which the timber's pressure is, or is likely to be, excessive. Of course, the full advantages of the system are obtained only when every set of timbers is braced.

Lower California Placers.

Late news from the Lower California Placer mines does not indicate any very promising prospects of a great mining field in that region. The lack of water is of course a very great drawback, even if the mines are as rich as was

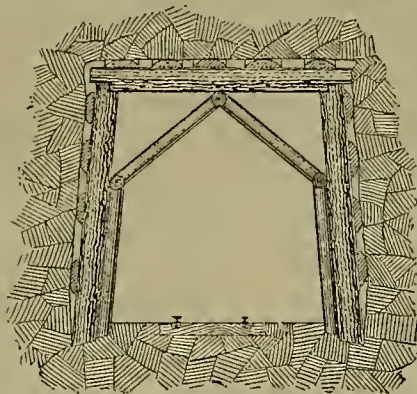


Fig. 1.

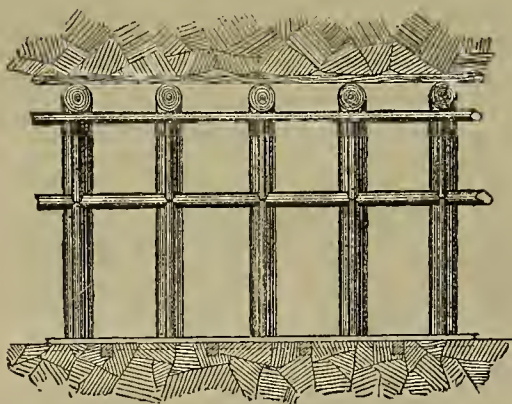


Fig. 2.

FRENCH SYSTEM OF TIMBERING FOR MAIN LEVELS.

is rendered capable of resisting a very great pressure.

The operation of fixing these bracing pieces are performed in the following manner. The workmen first place the longitudinal in position beneath the caps, and fix it there temporarily with pieces of wire. The length of this piece may be from nine to twelve feet. The side longitudinals are placed and held in position in the same way. Two or three of the uprights are then placed at suitable points beneath the side longitudinals, and some of the struts are inserted obliquely and driven gently towards their ultimate positions. The whole of the bracing being thus rendered self-supporting, the wire is removed, and the remaining uprights and struts put in obliquely, and driven firmly into their positions with a heavy mallet.

If the correct length has been given to these several pieces, and the work is executed by an experienced man, a firm and unyielding framing

is first represented. Mr. P. B. Chison, who has just arrived at Guaymas from the gold fields reports as follows: Since the exodus of the Americans some considerable prospecting has been done, and all those who have worked at the placers are making something. One party now at Muleje has sixteen ounces, the result of three weeks' work. An expedition well prepared with provisions and all tools for mining, has left for the placers. Quite a number are coming in from the lower end of the peninsula. A new gulch has been discovered some five miles from the present placers and nearer to the Mission of San Gertrude.

In this connection we would call the attention of parties owning dry placer mines to a new machine (pneumatic sluices), recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, which is intended for this class of ground. The agents, J. H. Suggett, Carlin, Nevada, or J. M. Thompson, 1252 Market st., in this city, will put the machinery on any good ground for an interest in the same.

Booming.

The term "booming" is applied, in mining parlance, to an operation much resembling the old process of "flushing," as used in Yorkshire, for discovering lead lodes. A reservoir is first constructed at the head of the ground to be worked. Into this water is conducted, from the most convenient source still higher up, by flumes or ditches. These reservoirs vary in size from a small pond to an acre or two lake, and the ditches are often 8, 10 and 12 miles long. When the basin is full, and a continuous head of water is in running operation, gates are opened, letting loose the whole volume of the liquid, which tears down the mountain side in a huge volume, sweeping everything before it, carrying tons of boulders, gravel and dirt down to the gulch below. If auriferous ground is to be worked, a long and massive wooden flume is built at the foot of the hill, into which the debris is carried with all the force of the falling waters, and the sand and rocks washed along in its course, while the gold is deposited by its own gravity behind the riffles in the bottom of the race. These flumes are built with great strength and solidity to withstand the immense wear.

The self-acting gate, now considered the best (whereby the opening and shutting of the gate of the reservoir is made automatic), consists of a water-box suspended in guides, the rope from which passes over two pulleys, one of twelve feet and one of five feet, to the lower edge of the canvas gate (barred with strips of iron or two-inch timber). When the water in the reservoir reaches the proper height, a small flume conducts it to the box, which, when full of water, has weight enough to roll up the gate at the bottom of the reservoir from the bottom, allowing the water in the reservoir to issue through a gate (generally 4x6 feet in size). By the time the reservoir is nearly empty, the water in the weight box has discharged itself through holes, made for that purpose, in the bottom, and a weighted arm on the second pulley drops the gate to its place, when the pressure of the water keeps it in place, water tight. One man is considered ample force to run a boom, and his duties consist mostly in clearing timber from the ground to be worked and in breaking the larger boulders into sizes small enough to go through the flume, which is usually four feet wide, with a grade of one foot in twelve feet. The use of a boom permits the working of ground that could by no other means be made to pay. The experience of the Summit county, Colorado, miners goes to prove that, notwithstanding the large amount of water used and the velocity with which it rushes through the flume, the gold collects readily in the upper boxes of the flume, in which mercury is generally placed. Booming permits the working of claims that would otherwise be valueless.

MINING is being conducted with great energy in the San Francisco canyon, above Newhall, says the Los Angeles Times, the only drawback being the scarcity of water and the failure to make a dry washer a success. From the grass roots down there is a show of gold, and could water be put on the land fortunes might be made.

EXTENSIVE concentrating works is what is required on Wood River. All our ores will pay to concentrate. It will be vastly more economical to ship concentrations than to ship ore, even were the rate only \$15 a ton.

The Comstock Lode.

A Virginia *Enterprise* reporter has been interviewing Mr. J. C. Flood, the "Bonanza King," and from the published report we take the following:

"Have you faith still in the Comstock?"

"Yes, I think as I always did. When it comes to looking for a mine, the Comstock is about the only place where I would go to look for it just now. These other places, which we hear so much about, are all right, but the Comstock offers the best prospect. Of course, the thing to do is to find a mine, and while the outlook is encouraging, all conjectures are useless in regard to the future. Find a mine, and everything will come round all right. The Comstock, in my judgment, is the field for work."

"Very true, but if there is any foundation in the stories now being circulated, the Bonanza firm is losing control of the mines up our way."

"That's all nonsense. We have not lost control of any mine which we desired to hold. The Yellow Jacket, over which there has been so much talk, I did not want; because, under the present circumstances, we could do nothing with it. The group of which it is the center, is of no account, unless concentrated in the hands of one management. I advised Morrow myself to go in and secure the control of Yellow Jacket, while it was to be had for a song. Even if we decided to hold that mine, it could not be done without unnecessarily exciting the market. As soon as we make the slightest move, they all jump up. Morrow and his friends can pitch in, and no one is any the wiser."

"But what about Union and Sierra Nevada. They say that those mines have slipped out of your hands?"

"As I said before, that's all nonsense. We have no intention of giving up the north-end mines unless the stockholders are dissatisfied. We are getting down pretty deep there, but with economy and with the advantages we have now in the way of machinery and the knowledge acquired in regard to the best methods of exploring at that great depth, there is no reason to apprehend that we are making any mistakes. The ground is interesting, but that of itself is not sufficient. We must find a mine, and that's what the stockholders want."

"Then you don't entertain any apprehension in regard to water?"

"Not a bit. We can take care of all the water that may come our way. Until I saw Patton I had some misgiving on account of the great depth where we are working. He is a reliable, faithful man, and a more skillful engineer never worked on the lode. He never loses his head, and is always at work, planning and studying what is best to be done."

"Yes, that's what those who know the man in Virginia City says about him, but the incessant strain seems to be telling hard on him. Mr. Patton is beginning to look like another victim of overwork."

"You evidently don't know him. He is as fresh as a boy. Why, up at Mount Cory he was as young and as full of life and energy as ever. The way he went through those levels and took out samples from every corner surprised me. There are few men that have the physical or mental resources in them for work that Patton has to-day."

"Then you don't believe that deep mining is played out?"

"I do not. That's an old scare-crow. When we were getting into Consolidated Virginia we were told we were going too deep. I thought differently. You know the result, and there's no use my saying any more. The Sutor tunnel gave us a new surface—a new startling point."

"How deep, then, do you think you can go and still feel hopeful?"

"As deep as we can find the ore. Patton tells me that he can go down to the 4,000 level with his present facilities. But don't misunderstand me. We must find a mine. I can only say that the situation warrants looking for one, even at that depth. We are justified in considering the Sutor tunnel level as our starting point when we talk about depth. So we are really no deeper now than we were when I secured control of Consolidated Virginia. In other respects the situation is a much more difficult one. Our safety lies in the practice of the most rigid economy. The reduced market value of silver makes an important difference. The financial world has been educated to believe that the Comstock, when productive, turns out nothing but silver, and that fact keeps the price of silver down."

"You don't mean to say that the mono-metalists and bi-metalists are ignorant of the fact that for every fifty-five cents in silver we produce forty-five cents in gold?"

"I mean to say that it is almost a fixed belief that the Comstock is exclusively a silver producer. Deidesheimer's speech did the mischief. That speech, in which he exaggerated the product when we found the bonanza, was published in every financial center, and it left a deep impression. It will take them thirty years to find out that the Comstock yields gold, as well as silver. Silver went down soon after Deidesheimer's talk, and it has never come up since, and does not seem likely for a long time to recover from the shock."

"When shall we see you on the Comstock again, Mr. Flood?"

"I promised Mackay, before he went away, that I would visit Virginia City soon. I have a dispatch from him that he is now on his way back. He left Moscow a week ago, and is

coming right home. In a short while he will be back. Then he and I together will pay your town a visit."

"Well, it is encouraging, Mr. Flood, to learn that you think well of Virginia City. Our own people have never lost hope. But we felt depressed at times during the long gloom, and what with Mr. Mackay in Europe, Mr. Fair going abroad and the accounts of your buying real estate extensively in San Francisco, and building great warehouses, we had come to believe that the bonanza firm were turning the cold shoulder our way."

"A man ought to be allowed to buy a little real estate."

"But Mr. Fair gave us a parting kick. He told a New York reporter there was no improvement on the Comstock, and gave him to understand that while there was hope—that was about all we had left. That was not kind, when every miner on the Comstock knows that the prospect has not been so encouraging for five years."

"Mr. Fair should not have said what he did. If he has not been misrepresented in what he did say, he did wrong. The facts, Mr. Fair is not a well man. He is ill. Six months in Europe may cure him."

The reporter had informed Mr. Flood of his connection with the *Enterprise*, and before he left him asked him if he had any objection to his publishing the substance of the conversation which had taken place. Mr. Flood replied that he had no desire to be made conspicuous in print, but if it would do the people of Virginia City any good to know his views, they were welcome to them. He believed the Comstock was the best place in the world to-day to find a mine, and the problem, which requires skill, courage, perseverance and economy, was to find the mine. He had faith in the men who were trying to accomplish that result, and he had faith in the old lode as strong as in hy-gone days, when men could be found who spoke as disparagingly of it as some speak of it to-day. He said also that the contract which Sutor had made with the mines was a good thing for the tunnel and a good thing for the mining companies. That contract was made on his (Flood's) advice. But for it Sutor would have "gone broke." But the tunnel was to-day its own best vindication. Without it we would be helpless in the deeper levels. The situation was encouraging both above and below the tunnel level. We had all been in such a hurry to go down, down, that the upper levels had not been half prospected. Improvements were still under contemplation. He had been considering the practicability of introducing the electric light under ground, and was now awaiting the result of certain experiments to determine the best patent. The scheme would not only save candles, but, if successful, of which he had no doubt, it would conduce to the safety and comfort of the miners.

The Anti-Miners' Attack Upon the Drill Miners.

We have often warned our readers and the quartz and drift mine owners that the statements of the anti-debris lawyers and the officers of that association were not to be relied upon. They have repeatedly stated that they did not intend to attack any quartz mines or drift mines but only intended to close the hydraulic mines. We have often called attention to the legal conclusion that if they close one kind or class of mines they could close any and all mines, and urged upon mine owners, other than hydraulic, the absolute necessity of joining the Miners' Association or some other mode of defense to protect their property and interests.

In the early stage of the present litigation between the anti-miners and the miners, Judge Van Clief was perhaps the most prominent of the many legal advisers and counsel of the anti-miners. For some good cause he has for a long time past not appeared in any of the present suits, and had apparently remained quiet, removing his residence from San Francisco to Sierra county. The reason is now apparent, for a suit has recently been commenced in Sierra county by a person named Kennedy, who owns a small piece of land on Rock creek, against the Ruby Mining company, whose only property consists of a drift mine, forming a part of the well-known Bald mountain channel. This company, after expending a very large amount of money in running a long tunnel and prospecting, found the channel a few months ago. No sooner do they get fairly at work than the anti-miners turn up in a suit, brought ostensibly for Mr. Kennedy, in the Superior Court of Sierra county, by Mr. Van Clief, against the Ruby company, to enjoin them from muddying the water or using Rock creek as a place of deposit for the tailings from the drift mine. The complaint is similar, in almost every way, to the stereotyped complaints of the anti-miners in the suits against the hydraulic mines, and asks for the same relief, i. e., an injunction to prevent the mine from being worked.

If this is not a practical refutation of the assertions of the anti-miners, and a complete justification of our assertions, that the statements of the anti-mining lawyers cannot be relied upon in any way, then we are much mistaken. Our mine owners, both quartz and drift, who have hugged themselves with the promise of the anti-miners, may, and we trust will, now awake to the fact that it is war all along the line, and the quicker they enter the field and buckle on their armor for the fight, the better will be their chance of not being forced to sustain an

isolated defense. For, as certain as it is now that the Ruby drift mine has been attacked by the anti-miners, so will all the principal drift and quartz mines be attacked. It is only a question of time.—*Nevada Transcript*.

Carbonate, Colorado.

J. D. Taylor, a Denver real estate dealer, returned from a two weeks' trip to Garfield county. He spent several days at Carbonate, and brings back favorable reports from the new Colorado eldorado. A *Republican* reporter engaged Mr. Taylor in an interview, and in response to numerous inquiries gave the following information concerning that new mining excitement.

How to Get There.

The best route is by way of Red Cliff, which is reached by the Denver & Rio Grande railroad. From that place to Dotsero, forty-five miles distant, the journey is made with freighters, but Wall & Witter expect to have a stage line in operation in about a week. The route is down Eagle river. The journey is continued the next day to Dotsero, which is reached about ten o'clock.

Dotsero.

The town of Dotsero is located at the confluence of the Eagle and Grand rivers, and is surrounded by a fine agricultural region. Its altitude is about 6,000 feet, and the population numbers 300. It has been the winter rendezvous for carbonate pilgrims, and has about sixty tents and cabins. The bridge across the Grand at this point has a length of about 450 feet, and will be completed within about a week. Dotsero has three saloons and two hotels, but no doctors or lawyers have yet located there.

Dotsero to Carbonate.

It is about twenty miles from Dotsero to Carbonate. Leaving Dotsero, a journey of one and a half miles is made up the Grand to the mouth of Deep creek. Crossing Deep creek the old Indian trail is followed to Ute Park. In following this trail an elevation of about 4,000 feet is made in going a distance of five miles. The journey is then continued between Deep creek and Sweetwater, until the head of Deep creek is reached, about three miles from Carbonate. Up to this point but little snow is encountered, and Mr. Taylor expects this part of the route to be free from snow in about three weeks.

Carbonate.

Carbonate has an elevation of about 11,000 feet, and at the present time it has a population of about 300. Eight men remained there during the winter. About two months ago the population numbered fifty people.

The town is located in the mineral belt, and, according to the statement of Mr. Taylor, a part of the town site has been staked off into mining claims. The formation is limestone, and the mineral is found both in veins and deposits. The character of the ore is principally argentiferous, but that region also produces gray copper, zinc blend, iron pyrites and carbonates. The Ryan shaft, now being worked, is seventy-eight feet deep, and is located near the main street of the town. The tests of the ore from this property show eighty ounces in silver and twenty-two per cent lead.

Mining in Snow.

In some parts, the snow has disappeared, and yet mining is now being followed in other places by digging blindly through the snow. Mr. Taylor located a claim which was covered with three feet of snow. When the ground cannot be seen the miners drive stakes in the earth 300 feet apart, and after locating as much territory as one desires, they commence to sink blindly in search of mineral. Though Garfield county occupies the western territory of what was formerly part of Summit county, yet by special laws the claims have the usual size of 300 by 1,500 feet. This mining district is supposed to have an area of 10x25 miles.

Iron and Coal.

Mr. Taylor further reports that there are large quantities of coal and iron near Carbonate. About three miles south of the town there are large and almost inexhaustible quantities of coal, similar to that found at Canyon City. Hematite of iron is also said to abound in large quantities in the same vicinity. Owing to these great natural resources, Mr. Taylor predicts that the coal and iron industry will yet be a prominent business feature of this new district.

Other Resources.

Fine timber lands also abound in this district. Numerous small lakes are found, containing a bountiful supply of fish. The agricultural regions along the river are rich and fertile. The parks are filled with deer and antelope, and bears are quite numerous.

To Have a Railroad.

The Denver & Rio Grande railroad is making arrangements to build a railroad to Carbonate. The railroad has already been completed to Rock creek, and a surveying party is laying out a route to Carbonate. Nineteen miles of the route have already been surveyed. Mr. Taylor is well pleased with the country, and predicts for it a brilliant future.

The value of mining stocks upon the San Francisco lists a few years ago was \$275,000,000, says the *Bulletin*, but the whole list is not now worth more than \$5,000,000.

Copper in Arizona.

The Arizona *Silver Belt* says: The extent of the copper deposits of the country through which the A. M. B. road will pass is difficult to determine. In what is known locally as "the Verde country," they are far more extensive (area considered) than they are in Globe district, though the work done on them has been comparatively little. Considerable prospecting is being done, and claims are taken and held by men who trust to the A. M. B. railroad to make them valuable. So far as actual production goes, these mines have no record, due to the fact that they are far from the railroad, and have no wagon road over which to haul their supplies or millions. In Globe district, the area of country in which copper shows as a leading mineral is irregular but extensive. Two miles from McMillen, east, it shows in strong veins mixed with silver, and it also shows west of the Bloody Tanks, a distance, longitudinally with the copper belt, of thirty miles. It is about two miles across. From McMillen to Globe it does not crop much, but from the latter place to the Tanks it is always present. The principal development is included in an area embraced by a sweep of four miles from the east, around the north, to the west. The ore is found in veins of varying size. That of the Old Globe is 150 feet wide—the largest; and that of the Takoma has the greatest depth—450 feet. Both of these, and the Buffalo and Long Island are on true veins and yield a high grade of ore. Copper production may be said to have started with the Carrie company, two years ago; but they did not score a success because of faulty management, and the silicious character of their ores; the latter feature making it necessary to use large quantities of flux, thereby reducing the percentage of copper, to such an extent that (with the enormous freights charged) it could not be handled. The Buffalo company erected a smelter and ran it with much success, but they too had to succumb to the heavy outlays and the reduction in the price of copper. The Old Dominion company erected smelters where they had no mine, and spent money lavishly and foolishly until the advent of J. J. Williams who wedded the mines and smelters, and has made a continuous record such as never was known in the history of copper mining before. The Long Island company, under Frank Nicholson's management, produced a great deal of copper, but high freights have stopped the work. The Takoma, a rich property, and the Old Dominion must also stop until a railroad makes it possible to use lower grades of ore, and pay dividends to stockholders instead of enterprise-killing freights to the Southern Pacific railroad and teamsters. The copper product of this district, for the actual running days is a revelation, as it passes six tons per diem for each smelter. From the data furnished by the different superintendents, we gather that, 21,650 tons of ore have been treated; that 3,777 tons of coke have been used; that 3,159 tons of copper have been produced, and that \$211,716 have been paid for freight. There are six smelters in Globe, all of which must soon be idle; if there was a railroad, all of the companies but one would increase their plant, and new companies, now organized, would commence operations. It is safe enough to say that twelve smelters would be operating in this district, in six months after the completion of a railroad; and between Globe and the A. & P. road at least twenty. These would consume an aggregate of 160 tons of coke each day, or 58,400 a year, and produce—say 29,200 tons of copper. With the cognate interests that must necessarily grow up about such an enlargement of this industry, it would seem to be, and is, a cogent argument in favor of the building of the A. M. B. railroad, not only as an agent in developing the country's wealth but as a channel for profitable investment.

DEBBS SUIT.—A dispatch from Marysville, dated the 13th inst., says: The trial of the case of Allen S. Noyes vs. the Spring Valley Hydraulic Gold Company closed to-day in the Superior Court of Sutter county, before Judge Keyser. The case was taken under advisement. Judge Keyser will visit the mine and plaintiff's land. The plaintiff asks for an injunction to prevent the defendant from discharging water and debris through Dry creek into and upon plaintiff's land. The defendant's mine is at Cherokee, and valued at one million dollars. It is one of the largest and best equipped hydraulic mines in the State, using a constant daily supply of 2,200 inches of water. The tailings from the mine flow through Sawmill ravine into Dry creek, thence between many miles of embankment constructed by the defendant's predecessor. The old company still owns 42,000 acres of land on which embankments are built, the use of which defendant had acquired by lease. After leaving the canal the defense claim the water is settled in the lake on Koppel's land, and thence flows pure into Batte creek, from the headwaters of which 1,800 of the 2,300 inches used at the mine is taken. The plaintiff, however, claims that water and slickens flow from the mouth of the canal down upon plaintiff's land four miles below. This trial lasted eight days and a great deal of contradictory testimony was introduced. The suit is not fathered by the Anti-Debris Association, and it is presumed that if an injunction be granted the plaintiff will sell his land to the defendant, and the latter's operations will be resumed.

MECHANICAL PROGRESS.

Hardening and Tempering Steel.

Prof. Chandler Roberts, of London, England, in a recent lecture on theoretical considerations connected with hardening and tempering steel, stated it to have been long known that there are extraordinary differences between the properties of wrought iron, steel and cast iron, but our knowledge that these differences depend upon the presence or absence of carbon was only a century old.

It was not until 1781 that Bergman, Professor in the University of Upsala, showed that wrought iron, steel and cast iron leave, when dissolved in certain acids, amounts of a graphitic residue, varying from one-tenth to two and a half per cent, which are essential to the constitution of these three varieties of metal. Bergman's work led many early experimenters notably Clouet, in 1796—to attempt to establish the importance of the part played by carbon, and Clouet converted pure iron into steel by contact, at a high temperature, with the diamond. Prof. Roberts said that this experiment had been repeated by many other observers with varying success, as in all the earlier work the action of furnace gases which had not been excluded, might have converted the iron into steel without the intervention of the diamond.

It remained for Mr. W. H. Pepsy to repeat Clouet's fundamental experiments under conditions which rendered the results unequivocal, by employing electricity as a source of heat. This experiment, which had been communicated to the Royal Society in 1815, was then performed in the way Pepsy had indicated.

It was then shown that in soft, tempered and hardened steel respectively, the carbon has a distinct "mode of existence," as is indicated by the widely different action of solvents on the metal in these three states. The evidence as to whether carbon in steel is combined in the chemical sense, or is merely dissolved, was then considered at some length, special reference being made to the results obtained by various experimenters, from Berzelius and Karsten to Professor Abel, of Woolwich.

Professor Roberts stated that the researches of Troost and Hanteculle afforded strong evidence that in "white" cast iron and steel the carbon is merely dissolved, a view which he adopted, as he did not consider it to be at all in opposition to the fact recently shown by Professor Abel, who had shown that in the carbon left by the slow action of solvents on soft steel is a carbide of iron. The various physical, as distinguished from the chemical, theories that had been propounded from the time of Reaumur (1722) to that of Akerman (1879), to account for the "intimacy of the relation" of carbon to iron in hardened, as compared with soft, steel were then described.

In recent years much importance had been attached to the physical evidence as to the peculiar constitution of steel, and it had been shown that there is a remarkable relation between the amount of carbon contained by different varieties of steel and their electrical resistance. Some of the very interesting experiments of Professor Hughes on this point were then exhibited and described. Professor Roberts concluded by saying that the value of the early work by Bergman and Reaumur had rather been lost sight of in recent discussions; and the importance of the degree of carburization of steel, from the point of view of its technical application, was illustrated by reference to a series of curves. It was incidentally mentioned that in the case of the variety of steel used for the manufacture of coinage dies, the presence of one-tenth per cent of carbon more or less than a standard quantity, made all the difference in the quality of the metal.

Modern Guns and Projectiles.

The United States Board of Engineers for Fortifications has recently submitted a valuable report upon the practice in Europe with the heavy Armstrong, Woolwich and Krupp rifled guns. The conclusions of this report are as follows:

"Experimental firings for penetration during the past twenty years have determined:
"1st. That wrought iron and cast iron, unless chilled, are unsuitable for projectiles to be used against iron armor; that the best material for that purpose is hammered steel or Whitworth's compressed steel.

"2d. That cast iron and cast steel armor plates will break up under the impact of the heaviest projectiles now in service unless made so thick as to exclude their use in ship protection.

"3d. That wrought iron plates have been so perfected that they do not break up, but are penetrated by displacement or crowding aside of the material in the path of the shot, the rate of penetration bearing an approximately determined ratio to the striking energy of the projectile, measured per inch of shot's circumference.
"That such plates can, therefore, be used in ship construction, their thickness being determined by the limit of flotation and the protection needed.

"4th. That though experiments with wrought iron plates faced with steel have not been sufficiently extended to determine the best combination of these two materials, we may nevertheless assume that they give a resistance about

one-fourth greater than those of homogeneous iron.

"5th. That hammered steel in the late Spezia trials proved superior to any other material hitherto tested for armor plates. The nineteen inch plate resisted penetration and was only partially broken up by four shots, three of which had a striking energy of between 33,000 and 34,000 foot tons each. Not one shot penetrated the plate. Those of chilled iron were broken up, and the steel projectile, though of excellent quality, was set up to about two-thirds of its length. This experiment seems to promise the solution of the problem to determine a material for armor plates which, though limited in thickness to the carrying capacity of the ship to be protected, will still have sufficient resistance to break up the projectiles of the largest guns now in the naval service, without being penetrated or broken by the projectile.

"It seems probable that a hammered steel plate, like that tried at Spezia, if equal in thickness to the belt armor of the Indefatigable (22 inches), would stop the shot of the 100 ton gun (Armstrong) fired with its greatest practicable velocity.

"Finally, these later experiments confirm this Board in its opinion, enunciated some years since, that, while the 12 inch rifled gun may prove a sufficient armament for the barbettes batteries of our sea coast defenses, as against the lighter ironclads of foreign navies, iron turrets, armed with guns of 100 tons weight at least, will be needed to meet the attack of armored ships of the latest construction."

The 100 ton chambered Armstrong gun, throwing a projectile of a ton weight, and fired with a charge of over 700 pounds of powder, may be taken as a sample of the monstrous requirements of modern war. Such guns must be both made and operated by machinery.

FAST WORK IN A CARRIAGE SHOP.—At the annual dinner of the Carriage Builders' National Association, in Philadelphia, Hon. Phineas Jones told of fast work he had lately witnessed in a carriage factory that turns out from 15,000 to 20,000 carriages a year. He said: "I saw them setting tires. I noticed how fast they put the tires on the wheels. They put on fifty-three sets of tires in fifty minutes. This is work, and a fact. One man put the tires into the oven and took them out after they were heated. There were about sixteen tires heated all the time in the oven, and then there were two rollers driven by a belt revolving all the time, with a strong fire at the rear of it, and when the tires were taken out two other men stood there and put them on. I timed them, and they put on a set a minute. And the man told me that one day, when the tire setter wanted to be away the next day, and it was then five o'clock in the afternoon—he told him those wheels had got to be tired the next day, and he said: 'I will tire them to-night.' There were fifty-three sets of them, and he put them on in fifty minutes. Those are facts. I noticed one man setting tires, and I timed him with my watch. He lit the forge and put on a tire a minute. I said that is lively work."

NEW ADAPTATION OF ELECTRICITY.—One of the most ingenious adaptations of electricity, recently introduced, is that by which machinery, when in motion, may be instantly stopped, as in the case of an engine. A wire rope, coiled around the stem of the throttle valve of the engine, carries a weight which is held in place by a rest, and the whole arrangement is such that the passing of an electric current along a wire releases this rest and causes the weight to fall. The tension thus thrown upon the wire rope acts upon the throttle valve, cuts off the supply of steam, and, consequently, stops the machinery. Buttons, with wire connections, are placed in different parts of the works, and on pressing any one of these the passage of an electric current acts as above mentioned. In any factory these electric buttons can be placed in every room, or several of them in a large room, as may be required. Should any one happen to be caught by the machinery, the simple pressing of a button in the most distant part of the factory will quickly stop the whole.

DRILLING GLASS.—For drilling holes in glass, a common steel drill, well made and well tempered, is the best tool. The steel should be forged at a low temperature, so as to be sure not to burn it, and then tempered as hard as possible in a bath of salt water that has been well boiled. Such a drill will go through glass very rapidly if kept well moistened with turpentine in which some camphor has been dissolved. Diluted sulphuric acid is equally good, if not better. It is stated that at Berlin glass castings for pump-barrels, etc., are drilled, planed and bored, like iron ones, and in the same lathes and machines, by the aid of sulphuric acid. A little practice with these different plans will enable the operator to cut and work glass as easily as brass or iron.

FIRE BRICKS FROM FLINT.—A new manufacture has sprung up in England, and one which, according to the *Iron* promises well for those who have embarked in it. This is the manufacture of fire bricks from flint, at works which have lately been started at Charlton, Kent, by the Thames Flint Fire Brick Company. The bricks are manufactured under Sir Henry Edwards' patent. These bricks have been tried in various steel and iron works furnaces developing intense heat, including Siemens' regenerative furnaces, and the results in all cases are reported to be most satisfactory.

SCIENTIFIC PROGRESS.

Tornadoes.

Sergt. John P. Finley, Signal Service officer at Kansas City, Mo., has published, in a pamphlet on tornadoes, some useful directions concerning the course to be taken to escape the attending danger. The inhabitant of a tornado-frequented district must be watchful in the season of visitations, for he can never know when the destruction will come upon him. On the first sign of the approaching vortex he must run—always to the north, unless by going in that direction he will have to cross the entire path of the storm. If he is nearer to the southern edge than to the center of the probable path, he may go south, bearing slightly east, but in no event run directly to the east or northeast. It is impossible to save any building which may lie in the path of the tornado, or any property that cannot be got out of its way. No material, no method of construction, can be competent to resist the raging destruction. Nothing rising above the ground can escape it.

The most practicable measure of precaution is to construct a "dug-out" at some suitable point, within easy distance from the house, to serve as a place of refuge or shelter. The retreat should be entirely underground, with a roof at least three feet thick, not rising above the surface of the earth, and entered from the northern or eastern side. A "cellar cave" may be constructed from the cellar, if the house has one, to serve as a substitute for the "dug-out." It should be excavated from the west wall of the cellar, toward the west, and should be made as complete and secure as the "dug-out." If, however, the storm cannot be escaped, if no refuge is at hand, or there is not time to get to it, the safest thing to do is to place one's self against the west wall of the cellar, face toward or against the south wall, as near the southwest corner as possible. The northeast quarter is in any case a fatal position, and should always be avoided. If one is actually overtaken by the tornado, his only resource is to cast himself face downward upon the ground, with his head to the east and his arms thrown over his head to protect it. If a stump or large stone, or anything heavy, that the wind will not blow over, is near, he may get a trifle of protection by throwing himself to the eastward of it. If in a house with no cellar, he should get into the west room, on the ground floor, if possible, and away from all stoves and heavy furniture.

The people of towns might find it to their advantage to provide for having a watch, to be on duty on all days when the air bears the premonitory symptoms of a violent wind-storm, to give a signal to the whole population on the appearance of the first real threatening signs. The signs of the formation and approach of a tornado cloud are distinct and sufficiently suggestive to afford opportunity for timely and concerted action. Sergeant Finley, is continuing, his investigations of the phenomena of tornadoes, and he has prepared three full schedules of minute inquiries calling for the facts attendant upon the appearance of the storms, which he sends to persons who were within the path of one, who were on the outer edge of the path, and who were within 10 to 100 miles from it.

SHALL WE SMELL BY TELEPHONE?—Who shall say that the principle of the telephone may not be applied to other senses than that of hearing and sight? "A few years ago," said a distinguished electrician, recently, "the distance at which you could hear a sound was limited. Now it is practically without limit. You can smell a flower only at a short distance. I do not see why a telephone for the nose might not enable you to smell a rose in New York, even though you were located in Atlanta. So of the taste and touch. A new application of the principle of the telephone might enable you to remain in Atlanta and kiss your wife in London, or taste a berry in Paris. The telephone has already made a clumsy step in this direction for the sight. We would have thought the man crazy a decade ago who said you could stand in New York in 1883 and hear every note of a concert in Boston. Quite as crazy as the man who now predicts that in 1903 you may sit down in Atlanta, see a theatrical representation in Cincinnati, smell a bouquet in New Orleans, taste a fresh oyster in Baltimore, and shake hands with a friend in Savannah, all at the same time. In these days it is only the impossible that happens."

WHAT CAUSES THE TIMBER LINE.—The cause of what is known as the timber line on high mountains continues to be discussed in scientific periodicals, and the attempt continued to connect the line in some degree with mean annual temperatures. The writer of this paragraph has had the matter in mind when on these high elevations, and the explanation seemed very simple. On all these high peaks there is a continuous, though in some cases slow, descent of the soil from the summit to the base of the hill. He has never seen a case, where there was soil enough to grow a tree, that trees were not growing. As the wash from rain or melting snow will be nearly uniform in a given range, there will be of necessity some uniformity in the timber line. On Mount Washington and other high places, little plots of dark vegetable earth can often be found far above the present timber line, the remains of trees which existed before the earth was washed away. What is called the timber line seldom shows graduated

sizes as a mere matter of temperature would call for. Generally the line is formed of very small trees, and immediately scrubby plants, from the absence of deep soil, begin. *N. Y. Independent.*

TWINKLING DURING AURORAS.—Arago, in his admirable note on Scintillation, says that at the end of the eighteenth century Dr. Usher remarked, that at Dublin the Northern Lights made the stars singularly undulating in telescopes, and that according to Neckers, de Saussure, and Forbes, the stars do not twinkle in Scotland unless there is an aurora visible. Montigny's observations of scintillations have coincided with many visible auroras. At each one of those coincidences the intensity of the scintillation was much greater at the moment of the aurora than on the previous evening or on the following day, when the atmospheric conditions were the same but no aurora was seen. When a magnetic perturbation is noticed at the Brussels observatory without any accompanying visible aurora; the intensity of the scintillation suddenly increases, and it is then much greater than on the previous evening or on the following day under the same atmospheric conditions, with the exception of the magnetic perturbations. *Comptes Rendus.*

CONDUCTIVITY OF CARBON.—A contribution to the theory of the carbon telephone transmitter is to be found in recent researches by Messrs. J. Probert and A. W. Soward. It has long been known that carbon has the power of absorbing and condensing gas within its pores, and also that resistance of carbon powder to an electric current through its mass is not a true resistance, but may be resolved into two factors—namely, the true resistance of the carbon particles and the resistance of or disturbance occasioned by the gas or air confined within the existing spaces. In blocks of solid carbon the air spaces are naturally smaller, and the resisting or disturbing influence is weaker than in the case of carbon powder, but still it exists, and the experiments of the gentlemen above mentioned prove that the conductivity of porous carbon in different gasses at different pressures varies with the chemical nature and density of the absorbed gasses.

THE RECENT ECLIPSE OBSERVERS.—The American eclipse expedition, which went out to the Caroline Islands, in the Southern Pacific, last March, to observe the total eclipse of the sun, has arrived in this city, on their way back. The observations made were very valuable and highly satisfactory. The chief work consisted, first, in the strong evidence obtained of the non-existence of a planet interior to Mercury. This result, in a scientific point of view, is very valuable. Most of the work done is of such a nature as not to admit of a popular statement, but it is regarded as entirely satisfactory to the astronomers. The English party photographed the spectrum, but their results cannot be stated until after the photographs have been examined in London.

MOTION OF SUN SPOTS.—Spencer, in a letter to Faye, reports the results of comparisons of his observations for twenty years, which seem to indicate a slight tendency in sun spots to move towards the equator, between the parallels of 5° and 10°, and a slight tendency to move towards the poles between the parallels of 20° and 25°. Carrington and de Rico found that the direction towards the equator predominated up to 15° of latitude, and towards the poles in higher latitudes. The tendencies were so slight that Carrington did not attach any importance to them. Faye regards these results as fatal to the hypothesis of Siemens, for if the sun is fed by an influx at the poles, he thinks that there should be a uniform tendency of the spots towards the equator in all latitudes. *Comptes Rendus.*

MOVEMENTS OF SUBMERGED BODIES.—In defending his hypothesis against the attacks of French academicians, Dr. Siemens refers to the experiments of Froude, at Torquay, under the direction of the English Admiralty. He arrived at the unexpected result, that a submerged body, if it moves with a uniform velocity through a perfect fluid, will encounter no resistance whatever. By a "perfect fluid" he understood a fluid free from viscosity or quasi-solidity, and in which no friction is caused by the gliding of its particles over one another or over the surface of the body. The luminiferous ether is presumably such a fluid, and the discussion of Siemens' theory cannot be settled until all the consequences of perfect fluidity are duly settled. *Comptes Rendus.*

PRESSURE BATTERY.—A. P. Zazareff has addressed a note to the French Academy relative to an electro pressure battery. The production of electricity is due to the passage of a solution of glycerine, under the action of a pressure which is more or less severe, through a mixture of coal and anthracite. *Comptes Rendus.*

MORE FOSSIL DISCOVERIES AT CARSON.—Another important discovery was made 14th inst., in the State prison quarry, at Carson. A few yards from the alleged prehistoric tracks, ten well-preserved teeth were found, about five inches long, recognized as having belonged to the species known as the saber-footed tiger.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior in proximity to the mines mentioned

CALIFORNIA.

Downs.—*Amador Ledger*, June 16: The Downs mine made a clean-up last week for a month's run, amounting to about \$4000. The mill has closed down, as the water supply will not be sufficient to insure another month's run. There is plenty of rock in sight, enough it is said to last for a couple of years. Sinking, however, is to be prosecuted during the period of forced idleness at the mill. The shaft is to be carried 100 ft deeper, which will give a total depth of 600 ft.

ous.—The first clean-up of Morgan's mill was made a few days back, based on good authority that the yield of the mill, better in fact than was anticipated, was not in a position to give the expectation that the yield was over \$2,000.

act figures, except that the yield was over \$3,000, which would give from \$6 to \$7 per ton. The hydro-
draulic claim, at the Oneida flat, which has been idle
for sometime for want of lumber, started up again
the other day. A splendid strike is reported, at a
spot half a mile or so north of Plymouth, on the
road leading to Nashville. Parties who have seen
specimens of the quartz say it is studded with gold,
and the discovery bids fair to create something of an
excitement. As usual, several claimants have already
appeared to the property, and vexatious litigation is
likely to be the result. The Loyal Lead mine is be-
ing worked with very encouraging prospects. The
first clean-up panned out \$2,000, which, it is said,
was more than sufficient to pay expenses. The
present crushing is expected to surrender at least
from one-fourth to one-fifth more than the last.

Calaveras.

GOOD DIRT.—Calaveras *Chronicle*, June 16: We have been informed that the gravel in the Empire mine in Old Woman's gulch, averages over \$1.50 to the car-load, and that there is plenty of it. That sounds like business. In the near future we shall endeavor to give a full description of this valuable property.

ANNALS.—Work

THE FAHEY TUNNEL.—Work is progressing favorably in the tunnel claim owned by Fahey & Co., near the French hospital. Tunnel No. 1 is in 200 ft., at the end of which a "raise" of 12 ft. was made and tunnel No. 2 run, which has now reached a length of over 200 ft. For a considerable distance the tunnel was run in old works which were badly caved and required a great deal of timbering. The object for which the tunnels are being run is to reach the channel in the Stockton Hill ridge.

Sales at San Francisco Stock Exchange.

THURSDAY A.M., June 21.	450	Alta	.....	60	Alta	.....	60	
550 Argentina	150	20	Arg.	.....	30	Andes	.....	70
200 Andes	.....	65	40	Atlantic Co.	.....	10	.....	10
250 Alta	.....	60	65	30	Albha	.....	.....	.....
100 Belmont	.....	.....	.....	150	8	B. & Belcher	.....	7
100 Albha	.....	.....	.....	250	20	Boul. Con.	.....	10
35	B. & Belcher	.....	4	200	Belmont	.....	.....	1
550 Belle Isle	.....	.....	.....	100	Benton	.....	.....	05
100 Benton	.....	.....	.....	300	Belcher	.....	1	40
50 Belcher	.....	.....	.....	100	Belmont	.....	.....	.....
100 Bodie Con.	.....	.....	.....	735	Chollar	.....	3	40
200 Con. Virginia	.....	.....	.....	50	California	.....	.....	30
550 Chollar	.....	3	40	550	Con. Virginia	.....	.....	60
20 Crown Point	.....	.....	.....	100	Chollar	.....	.....	.....
450 California	.....	.....	.....	50	Challenge	.....	.....	.....
40 California	.....	.....	.....	405	Crown Point	.....	1	45
50 Condeance	.....	.....	.....	50	Condeance	.....	.....	.....
1000 Day	.....	.....	.....	780	Day	.....	.....	.....
100 Excelsior	.....	30	60	30	Day	.....	.....	.....
300 Gold & Curry	.....	25	1170	600	Grand Prize	.....	.....	.....
700 Grand Prize	.....	.....	.....	385	Hale & Nor.	.....	7	67
240 Grand Prize	.....	.....	.....	100	Independence	.....	.....	.....
630 Mexican	.....	.....	.....	100	Independence	.....	.....	.....
300 Mexican	.....	.....	.....	710	Mexican	.....	3	20
550 Najavo	.....	2	33	710	Mexican	.....	3	20
520 Najavo	.....	2	32	785	Najavo	.....	.....	.....
200 Overman	.....	.....	.....	25	Northern Belle	.....	.....	.....
150 Overman	.....	.....	.....	30	Overman	.....	4	05
350 Savage	.....	1	30	30	Overman	.....	.....	.....
805 Sierra Nevada	.....	4	650	650	Potosi	.....	1	00
270 Scorpion	.....	.....	.....	100	Savage	.....	2	63
100 Sierra Nevada	.....	.....	.....	100	Sierra Nevada	.....	.....	.....
200 Sierra Nevada	.....	.....	.....	205	Union Con.	.....	5	65
80 Utah	.....	.....	.....	30	Utah	.....	3	20
2040 Union Con.	.....	4	80	80	Wales Con.	.....	.....	.....
200 Yellow Jacket	.....	.....	.....	100	Yellow Jacket	.....	4	60
200 Yellow Jacket	.....	.....	.....	.....	.....	.....	.....	.....

Mining stocks have fluctuated considerably this week, but have been more downward than the other way. Yet at the principal mines, on the Comstock and at Bodie, nothing has occurred to change prices five cents either way.

At the north end, nothing more is known of the ore vein on the 3000 level than when the joint Union and Sierra Nevada winze was first started. All work is still to the east of where the ore body cut on the 2900 will strike the 3000 level. Nothing more is known of this deposit of ore than was seen where it was mined on the 2900 level. The diamond drill will not be used in the crosscut, unless indications of a dangerous flow of water are seen. At the Yellow Jacket they are extracting about 150 tons of ore per day, and are opening new ground, which will probably considerably increase the daily yield. Much good ore is still being found in the Belcher and Crown Point mines.

Pinal Con., June 4th to 8th, inclusive, \$9,110; Contention, 9th, \$23,980; Bodie Tunnel, 13th, \$3,195; Diablo, 11th, \$8,297; Syndicate, 5th, \$9,042; Stan-
lard, 11th, \$21,369; Mt. Diablo, 14th, \$6,336; Northern Belle, 14th, \$7,381; Pinal Con., 9th, \$1,124; Bodie, 18th, \$6,660; Head Center and Tran-
quillity, 16th, \$4,973; Contention, 16th, \$22,333; Pinal Con., 10th to 15th, inclusive, \$5,625; Han-
auer, 13th, \$2,320; Horn Silver, 13th, \$9,000; Storm-
out, 14th, \$3,240; Nevada, 14th, \$1,870; Horn Silver,
14th, \$9,000; Hanauer, 15th, \$2,230; Horn Silver,
15th, \$9,000; Alice, 15th, \$22,984; Horn Silver, 16th,
\$9,000; Tintie, 16th, \$3,650; Turrill, 16th, \$1,489;
Hanauer, 17th, \$4,300; Horn Silver, 17th, \$9,000.

AN oil well is being sunk on the summit of the range of mountains back of the Ojai, Ventura.

WE would advise all parties looking for work to stay away from Grantsville. There is nothing being done in any of the mines, and we are under the impression that things will remain as they are until his Satanic Majesty influences the powers that control the production of the precious metals to order it otherwise.—*Grantsville Bonanza*.

CONSIDERABLE excitement prevails in Bodie over recent mining discoveries about the head of Parker canyon, and also over developments in other portions of Prescott district.

THE trial of the debris suit of Noyes vs. Spring Valley Hydraulic Company has been commenced in Sutter county.

A FINE vein of building rock has just been discovered on the Los Felis rancho, Los Angeles county.

last Tuesday. He received per railroad a large number of ore sacks and has gone at work on the Drummer Boy mine, in Mazourka canyon, to ship ore already out and to extract more— as many carloads as can be found that will pay.

RICH GRAVEL.—Homer *Index*, June 16: The Virginia Creek Hydraulic Mining Co. is reported to have cut into some exceedingly rich gravel—\$2.50 to the pan. The Gorilla tramway will be completed in a few days, when the hauling of ore will be commenced and the reduction works started up. William Erwin and Charles L. Drew have leased the Mocking Bird mine, and are now extracting ore to be reduced in the Parsons astrata.

OLD MACK MINE.—*Transcript*, June 17: Work will be resumed to-morrow in the Old Mack mine at Canada Hill, after a brief suspension on account of the Eastern owners not being prompt enough in making a needed remittance. The incline, which is down 125 ft, will be sunk deeper. The 6 and 4-inch pumps in use are not powerful enough to handle the water, and a 10-inch pump will be substituted for the 4-inch one.

RICH ROCK FROM THE SLATE RANGE.—*Grass Valley Union*, June 10: A clean-up of 17 loads of quartz from the Slate Range (Perrin's) mine, was made at Sothern's mill on Wednesday, which yielded \$146 to the load. A previous crushing went some thing like \$82 per load. This rock is a portion of a tribute contract of 50 loads which is being taken out by working miners. They have the ground opened with enough rock in sight to complete the contract which is expected to yield equally as well as that which has been taken out. In the meanwhile the proprietors are sinking a whim shaft on the ledge at the same point on the vein, and will be able to work down on the incline over 300 ft without having to pump, as the vein is drained at that depth by a tunnel.

CRESCENT MINE.—Greenville *Bulletin*, June 16. During the absence of Mr. Davis at Virginia City the mill and all work in the mine was stopped. Immediately on his return last week he resumed work in both mine and mill, and now everything is going on as usual. There is some difficulty or misunderstanding between Mr. Davis and parties in San Francisco who are interested in the mine. A clerk sent here by them, and claiming to be acting under orders from them, ordered the mine and mill stopped as stated. Mr. Davis regards this man as his subordinate, and will not permit a mere clerk to interfere with him in the management of the mine. Mr. Davis claims a title in the property and a personal interest in the working of it, and seems to hold that if the others do not choose to be interested in the work there is nothing to prevent him from continuing it on his own account.

GREEN MOUNTAIN MINE.—The old mill was stopped on Sunday to admit of some repairs in the machinery. This will be finished about Friday, when the mill will again be started up. The new mill is running steadily as usual. Some very good ore has lately been taken out in the upper levels, the yield of bullion showing a gratifying increase. In the tunnel the ledge has improved very much in appearance during the past few days. The walls have become better defined and the quartz is now of such a character as warrants the belief that the expected pay ore will be cut into very soon. In fact it is quite reasonable to believe that a good chimney may be found any day, or even any hour.

RICH.—*Mt. Messenger*, June 16: The lucky owners of the Four Hills Quartz Mine, near Eureka, Plumas county, have a bonanza in the shape of a pocket, nearly all gold. Pieces, weighing several ounces, of the pure metal, are taken out; and the ore is said to be rich beyond any other seen in that valuable mineral region.

San Bernardino.
ALHAMBRA. -Calico Print, June 16: The large force of men that have been employed on this mine has been withdrawn, and only three men are working at present prospecting an open cut. The bin is full of first-class ore.

LYON.---Since the connection of the two tunnels, making a continuous tunnel through the hill, stoping has been going on energetically, and a good quantity of ore that will average well has been taken out. The ledge is four or five ft in width, and the paying streak about two ft. This mine has an exceedingly fine prospect. It is the intention of the owners to commence hauling ore to the Pioneer mill at Hawley's in a short time.

DUNDERBERG.—The shaft in this mine is down 30 ft on the extension of the body of ore that runs through the Gobbler and is equally as rich. The cars are kept busy running the ore over the tramway, a distance of 550 ft, into the ore bin.

GOHBLER. This promising mine, one of the excellent group belonging to the Alhambra M. & M. Co., is still progressing in its developments; 18 men are taking out a large quantity of good ore, there being 50 tons of the same in the bin. Two teams are kept busy daily hauling ore to the mill. Sinking in the shaft continues and stoping has been commenced in both tunnels. An ore body ten ft in width has been opened on both sides of the shaft, which extends the entire length of the tunnels and has every indication of going down to an indefinite distance. The yield in bullion from this mine is at present considerable, and as work is now performed underground, the miners will not be so affected by the heat as to be obliged to suspend work during the heated term.

COMET. This mine, so promising and so favorably located next to the Little V is owned by Tom McFarlane, J. W. Waters, Jr., and Jack Cokeran. It has been thoroughly prospected with most favorable results, ore being uncovered in several cuts. A good road has been recently graded to the mine, which reduces the expense of getting the ore to the mill. In a few days teams will commence hauling the ore to Hawley's station.

SNOW BIRD.—Work is progressing on this mine slowly but surely. The results of developments lately have been quite encouraging. In the north-west corner of the claim two men are taking out ore in small quantities, yet it is exceedingly rich.

PUMPING.—*Mt. Messenger*, June 16: The B. M. Ex. Co. have started up their pumps at the Pliocene

shaft, water in the South Fork having slackened off to such an extent that they were not able to wash all the gravel they are getting out. The American Hill Co. expect to finish cleaning up on Saturday. They have had another cave since last week, covering up more of their bottom. The yield this season will be no fair criterion of the richness of the mine.

UNCAS.—The Uncas Co. did not redeem the Hog canyon property at the expiration of the time of redemption it having expired a few days since. P. A. Lamping and Capt. Mead, of Oakland, are now up looking at the property. Mr. Lamping expects to take charge of and to develop the property at no distant day. The face of the North America tunnel, run from near Gilsonville, Sierra Co., is now in Plumas. The gravel pays \$2.25 per carload. There are no idle men in Downsville. All the miners here, as elsewhere throughout the county are busy in their claims. Sierra's gold yield this year will be larger than for many years past. Work on the foundation of the Sierra Butte quartz mill, has been commenced at Sierra City. The Bald Mt. Co., at Forest City, last week, cleaned up 180 ounces of gold.

YIELD.—The yield of the Ex. Co. last week was 110 ounces, working 20 breasters. Several coarse pieces were found.

Trinity

PROSPECTING.—Trinity Journal, June 14: Prospecting in Bullychoop district is being vigorously prosecuted and rumors of new finds reach us every few days, without sufficient particulars, however, of which to make an item. Send us the facts if you have anything worth mentioning.

NEVADA.

Washos District.

CIDELLAR.—Virginia Enterprise, June 16: The last work done in this mine was a drift started June 4, at a point 12 ft west of the main lateral drift in crosscut No. 3. This was pushed ahead 22 ft in quartz, clay and porphyry, when work was suspended and the main south drift temporarily bulkheaded to keep back the heat, when the force of miners was transferred to the Hale and Norcross to assist in making an air connection between the 2400 and 2600 levels. The men are still at work in an upraise on the 2600 level of the Hale and Norcross.

UNION CON.—At the 3000 level a station has been cut out and a west crosscut started.

SIERRA NEVADA.—On the 3000 level a station (joint with the Union Con.) has been completed and a west crosscut started.

HALE AND NORCROSS.—The winze below the 2600 level is down about 27 feet. The ore on the west side still continues. The upraise from the 2600 to meet the winze coming down from the 2400 level is up 10 feet. On the 2400 level the winze has been hauled out nearly down to the 2500 station.

SAYAGE.—No work is being done at present in this mine, but once connection has been made between the 2400 and 2600 levels and a good circulation of air obtained, prospecting operations will be resumed under more favorable circumstances than at any time during the past seven or eight years.

YELLOW JACKET.—Are extracting some 150 tons of ore daily, and are doing a good deal of prospecting; also are cleaning out and retrimming old drifts at points where ore is likely to be found. They are now taking out nearly \$80,000 per month.

OPHIR.—Good progress is making in the work of repairing the old Central tunnel, and in the preparation for hoisting ore at the old croppings.

GOULD AND CURRY.—West crosscut No. 2 on the 2500 level is now out over 500 ft. The material is quartz, clay and porphyry. The porphyry is quite hard.

MEXICAN.—On the 2900 level the upraise to meet the winze down from the 2700 level is progressing at the rate of from 10 to 12 ft per week.

CON. VIRGINIA.—Sinking on the C. & C. winze progresses at the rate of 10 to 12 ft per week. On the 2700 level the southeast drift is being repaired and a drain is being cut.

SCORPION.—On the 500 level the west drift is being advanced at the rate of 12 ft per week. The ground is the usual vein material of that section.

ANDES.—Some very fair ore is being found, and the indications are favorable at several points, where promising streaks of quartz are coming in.

Belmont District.

PROGRESSING.—Belmont Courier, June 16: The work of repairing the Belmont mill is progressing steadily.

Columbus District.

NORTHERN BELLE.—The southwest drift on the fifth shaft level has been extended 8 ft during the week, its total length being 114 ft. The formation is hard quartz, carrying streaks of sulphurets which give assays as high as \$40 per ton. The crosscut to the south, on the same level, has been advanced 10 ft into ground promising well for ore. Some ore of a very good grade is being extracted from the seventh and ninth levels. Ore hauling was resumed on Tuesday last, and was the first delivery for a week. The force at work in the extraction of ore has been kept up meanwhile, the surplus being stored in the chutes in the mine. Owing to the stoppage of the mill but one shipment of bullion has been made. This was on the 14th instant, and amounted to \$7,381.08.

MOUNT DIABLO.—The stoppe from winze No. 2 shows several seams of \$70 ore, in all about 2½ ft in width. A stoppe has been started from the east drift, on the second level, and has cut 15 inches of \$75 ore. The stoppe above the west drift from the Callison winze is looking well and yielding a number of tons of \$80 ore daily. The ledge averages fully 2½ ft in width, and in the center of the stoppe there are fully 5 ft of \$100 ore.

Jefferson District.

ORE.—Belmont Courier, June 16: Charles Kanrohat has struck a good body of paying ore in one of his mines at Jefferson.

The Jefferson S. M. Co. is prosecuting the work of development with energy. The mill is running nicely, producing the usual quantity of fine bullion.

Pluto District.

MINING NOTES.—One-half ton of ore per day is being sent to the surface from the Fair Play on Alhambra hill. In the Western Globe a drift from the 120 level is being run on good ore, and a shipment will soon be ready for the furnaces. Richard Berry-

man & Co. are taking some good ore from the Uncle Sam tunnel. The Jones Brothers have been shipping some very good ore from the Queen mine to the Richmond furnaces. The Queen mine is situated on the west side of Silverado mountain, adjoining the old Resene, and has been an ore producer from the grass roots. The Silverado M. Co. are driving their tunnel ahead to connect with an ore body that has been traced from the surface to a depth of several feet and a large quantity of ore taken from it. M. B. Bartlett & Co. are actively at work upon the old Champion mine on Alhambra hill. O. H. Smith and Richard Berryman Jr. have run a tunnel along the contact of the limestone and trachyte.

Reveille District.

AT WORK.—Belmont Courier, June 16: Mine owners are hard at work in Reveille district, this county.

Safford District.

THE ONONDAGA.—Safford Express, June 16: The shaft near the crest of the hill is down 15 ft, the ledge showing strong in the bottom. Foreman House will erect a windlass as soon as timbers can be got across the Humboldt. The lower tunnel is being driven in as fast as practicable by two shifts. No ore is being broken for want of room to place it, every available part of the dump space being filled to overflowing. The Humboldt is still rising, and unless it recedes soon work is likely to be suspended.

OUR ORES.—It seems somewhat strange that Safford ores can be shipped to Salt Lake City and worked at less rate than in our sister town Eureka, though such appears to be the fact. It seems to us that satisfactory terms could be made with the E. & P. road and the smelters at Eureka by which our ores could be shipped to that place and worked at a profit. At least a fair test can be made, and we are informed that Supt. Read of the Eureka Con. is willing to make such test and if possible ascertain if our smelters can compete with those of Salt Lake. The E. & P. road, we feel confident, will offer liberal inducements, and in so far as the experience has never been tried, we suggest that some of our mine owners ship a car-load of ore to Eureka, as it will prove the means of settling all further doubts in the matter.

San Antonio District.

LEACHING.—Belmont Courier, June 16: George Nicholl & Co's leaching works are still running successfully in San Antonio district, this county.

Santa Fe District.

BRADLEY'S LAST FIND.—True Fissure, June 16: Santa Fe district is full of life at this time, some good prospects being found and all the mines at full tide of industrious development. The Rattlesnake is a promising claim owned by Owen Bradley. It is opened to a depth of 30 ft, where it shows a ledge of 8 ft. The average assays have been very encouraging, going as high as \$80 in gold with a fair showing of silver. Mr. Bradley has several tons of ore on the dump, from which he expects to make a shipment very soon.

Taylor District.

ITEMS.—White Pine News, June 16: Joe Carothers has put about 20 men to work on his company's mines. The Monitor is employing 32 men. This is a \$4 a day camp, and woe to the man who would offer to work for less. Joe Carothers commences this week to grade for his new mill. There are lots of men here, ready to do the work at short notice. The Monitor mine is looking well, with plenty of good ore in sight. W. G. Lyons, who owns a third interest in the property, looks after the mine. Robert Briggs will superintend the mill during McGill's absence East.

Tuscarora District.

GRAND PRIZE.—Times-Review, June 14: Mill is now working some tribute ore from the old chloride stopes. As soon as it is worked, will mill the company's ore.

ELKO CON.—Drift No. 4 has been advanced 13 ft the past week. The formation is hard syenite. Will cut the west lateral vein within a distance of 10 ft from the present face of drift.

NAVajo.—Good progress is being made above and below ground. The new boilers will soon be in place and other improvements will be completed as soon as possible.

BELLE ISLE.—North drift, 450 level, has been extended 88 ft; progress during the past week 15 ft.

ARGENTA.—Stopes producing some good ore, but the ledge is small. Shipped crude bullion valued at \$9,500.

Tybo District.

SOON START.—Belmont Courier, June 16: It is expected that the Tybo mill will soon start up on ores from the 2-G mine.

White Pine District.

HAMILTON NOTES.—White Pine News, June 16: The Smoky mill started up again on the 8th instant, and everything is running smoothly. They have put in a large new whistle which is as sonorous as a foghorn. A small force of miners has been put to work on the Edgar mine, two men on the Mammoth, and several others are at work at other mines on the hill. Austin Jacobson is taking out some fine ore in the Konigsberg. It is chloride, black metal and galena and will go \$300 to the ton. Capt. Drake expects instructions daily from London to resume work with the Burleigh drills in the tunnel. Our town wears an air of prosperity and people seem contented and in better spirits than for years past. Four dollars per day is paid for underground work by the Eberhardt and Sweetwater companies. Italians are mostly employed around the mill, who get \$3 per day.

ARIZONA.

THE OUTLOOK.—Prescott Courier, June 16: The so-called "mining outlook" is now very encouraging in Arizona. Here in Yavapai county, the mining industry, as far as carried on, is more successful than at any previous time in our history. We have the Howell reduction works sending out two or three tons of bullion daily; the Copper Mountain works; the Black Warrior mill; the Tip Top mill and many others. The Peck is being put in condition to produce bullion. Callen's Walnut Grove mill will commence crushing Monday next. We might mention other works, but have named a sufficient number to let people know that it is not all talk and no silver. In addition, considerable rich ores are being sent east and west for treatment. As Mr. Douglass, the great copper man, has arrived and was, yesterday, in Cop-

per basin, examining C. C. Bean's properties, we may set it down as a fact that furnaces will soon be running there, too, as well as at the Eureka mine, in Black Hills. Persons who are acquainted with mines owned by the Callen Co., in Walnut Grove district, express confidence in the result down there. The Josephine, at a depth of 70 ft, has 5 ft of gold bearing rock, which will yield, by mill process, at least \$40 a ton. The mine has a streak of free gold rock which is as rich as any ever before seen in this land of metallic wonders.

PINE SPRING MINE.—Arizona Miner, June 16: On Thursday evening, June 7th, Gavin & Co. had sunk 15 ft on their great bonanza, and at that depth the ledge showed better than on the surface some 30 inches of ore showing itself near the hanging wall. Of this 10 inches is fully \$15,000 ore, while the remaining 20 inches is \$1,500 value. At the present writing \$50,000 have been taken from the mine, with every indication of permanency. The walls are now solid and smooth, dipping at an angle of 45°. Many people thought that the owners were off, because of having refused \$150,000 for this property, when there was but a hole of 5 ft sunk. It now transpires, however, that they were wise in refusing the offer, for, let the mine turn as it may, they have out \$50,000 and \$100,000 in sight; hence they can't lose, but have a fair prospect of getting millions. Since the settlement of Arizona commenced no such find or strike has been made as that of Gavin & Co. The ore is marvelously rich and the vein unusually large for such high grade vein matter. The extensions are being worked, showing the same decomposed material as is found in the original discovery, and the probabilities are that good ore will soon come in.

SILVER KING.—Final Drill, June 16: The town of Silver King is booming and many people are pouring in. On the Monarch of the Sea they now have a tunnel of 200 ft. From the crosscut they have obtained first-class ore. Sinking will begin next week. The Silver King Co. is building an office at the mine. They are sinking the main shaft and are striking for 1000 ft; they are now making a station at 800 ft.

COLORADO.

MONARCH DISTRICT.—Cor. Denver Republican, June 16: Work has again been resumed on the Oshkosh. This excellent property is but a short distance from the town, and of such easy approach that, at a small expense, its ore can be directly loaded upon the cars. Discovered in 1878, it remained in possession of its locator till the following year, when development began, which has at intervals been continued up to the present time. After the discovery of the ore body was made, a tunnel of 135 ft was run, and ore taken out in sufficient quantities to prove beyond a doubt that the mineral existed in a large and well defined body. Mill-runs show returns of \$34 per ton, net. The property is now patented, and will be hereafter steadily worked. The owners intend to be ready for regular and continued shipments as soon as the railroad reaches the camp. Among other improvements and additions to the facilities of the town may be mentioned the saw mill, lately erected and in operation about a mile above town and at a point below a fine growth of timber, composed of white pine and spruce. The marble discoveries on the northwest side of town will be opened up for quarrying in a very short time. Such development as has already been done shows this new and valuable property to be of great extent and the quality has been pronounced by experts to be of very fine and beautiful character. So far the full extent has not been positively determined, but even at the present time such a large body has been uncovered as to warrant the employment of labor for the full development of it. Work upon it will be commenced in a short time, and a further and more comprehensive description will be then made in future communications. Although shipments of ore are being made, still considerable is accumulating on the ore dumps and in the ore houses, awaiting the arrival of the Denver and Rio Grande road.

CALIFORNIA MINE GOLD RETORT.—Register Call, June 16: W. J. Lewis brought up from the mills of the California mine company in Black Hawk to-day 200 ounces of gold retort cleaned up the past two weeks from 100 stamps. The output of this splendid property in milling and smelting ore is yielding \$25,000 per month. Sinking in the main shaft is being continued. It has attained a depth of over 1,400 ft—the deepest mine in the State of Colorado.

SPLENDID RETURNS.—The California mine company's production of mill retort from last week's run aggregated 382 95-100 ounces gold, 100 stamps running. The several retorts having a currency valuation of \$5,112. The quality, quantity and richness of the ore does not diminish as depth is attained the best mill dirt coming from the lower workings. The California mine company have the pluck and backbone to continue deeper developments, and they are to be congratulated in meeting with the success that is rewarding their capital and labor.

MONTEZUMA.—A postal received from A. Wettstein, from Montezuma, Summit county, last evening, states that snow storms on Collier mountain, where he is working, are of daily occurrence. He advises miners not to come of there just at present, as very little development work can be done at this time. The St. Johns company are trying to make arrangements with the railroad company for shipment of ore to the Denver smelters on a reduced basis of rates. Should they prove successful, the company will put 60 miners at work near that place. With more favorable weather for mining and prospecting, business of all kinds will increase.

IDAHO.

WOOD RIVER ORE AND BULLION.—Times, June 16: A freight train, of seven cars, left Hailey for Omaha yesterday forenoon, and another was to leave for the same place about five o'clock this afternoon. The train that left yesterday morning took three carloads of bullion and two of ore for Omaha, one of brick for Shoshone, and one of miscellaneous freight for way points. The ore and bullion cars went direct to Pocatello, and on to Omaha. Ore and base bullion are now arriving at the depot at the rate of about three car-loads a day, on an average. As the weight taken on each car is between 12 and 15 tons, it follows that the daily yield of ore and bullion at present is about 40 tons. This is a very small yield, to be sure; but it must be borne in mind that the high freight tariff—\$30 a ton to Omaha—has prevented

mine-owners from selling any ore except such small quantities as were required to procure the wherewithal to pay running expenses. Since the reduction of rate to \$27 per ton, however, (which was announced yesterday) the miners have doubtless determined to make more liberal shipments, and it is probable that, within two weeks, the shipments will average at least 60 tons per day.

OUR POSSIBLE ORE YIELD.—Wood River, June 16: Careful figuring, based upon measurements of the ore bodies now thoroughly opened by drifts and winzes, and ready for the drill and pick to extract from the mine, show that according to the rate of each man's work so far in taking down ore, there can be the following lots extracted regularly per month from the mines named below, as soon as the mine owners desire to make shipments. The amounts given are approximated from the daily product and placed in the aggregate as monthly shipments for better understanding of the shipment facilities required. Here they are: Mayflower, 500 tons; Bullion, 500; Jay Gould, 300; O. K., 240; Ophir, 150; Rough and Ready, 75; Mountain View, 75; Idahoan, 240; Eureka, 300; Valley View, 150; Point Lookout, 150; Parnell, 75; Chicago, 75; Total, 2,830 tons. As will be seen at glance only mines at Bullion, or in the immediate vicinity of that town, are mentioned. If Deer Creek, Warm Spring Creek, the mines around Bellevue, on the East Fork and elsewhere be taken into consideration, it will be generally admitted by all who understand the matter, that the figures above given can be readily doubled, and the yield thus brought up to 5,660 tons per month. This yield cannot be expected now, however, owing to the high freight rates; but with lower rates the product would soon reach the quantity stated.

ROCKY BAR AND ATLANTA.—Cor. Bellevue Star, June 16: The Ada Elmore mill is running, and also a 10-stamp mill below town. These two mills, and the mines from which the ore is extracted, give employment to about 100 men. One hundred and fifty men are at work at Atlanta, and there are many more who are idle and will not be employed till the wagon road is open to Rocky Bar, which will not be for three weeks yet. Grading for two of the new mills at Atlanta has commenced, and teams are in demand. The mines are now looking first rate, and very lively times are anticipated.

MONTANA.

PHILIPSBURG.—Inter-Mountain, June 16: The Philipsburg mining district, which for some years has been resting on its laurels, and in which very little deep development has been going on lately, has entered upon a new lease of active life and is having a genuine boom. This fact is owing in a great degree to the recent developments on the Granite Mountain in tunnel No. 2. The tunnel has a total length of a little more than 1,000 ft. The rich pay ore was first encountered at a distance from the face of about 900 ft from which point the ore has preserved a uniform width of three ft, increasing in many places to five for a length of 130 ft. This shoot as far as explored samples 300 ounces, though much of its product assays considerable more than that. Within a few days 500 tons of \$500 ore will be shipped to Cheltenham, near St. Louis for reduction in the Harrison works.

NEW MEXICO.

NOTES.—Los Vegas Gazette, June 16th: The Iron King mine at Kingston is improving with every day's work. Recently it has been put in a good condition for stoping. The large amount of travel on the Silver City & Deming road indicates an unusual activity in the mines of the interior of Grant county. Tinhorn capitalists are not thriving in New Mexico to-day. Miners have learned to size up a man's pile before entering into any extensive negotiations. The Superior and Bullion never gave greater promise of permanent value than they do to-day. The camp of Kingston may be depended upon. All the mischief in it has disappeared. The mines about Fleming are yet the wonder of the world. Whoever heard of a \$500,000 property being paid for out of the workings from the grass roots down at the rate of \$75,000 a month, as is the Old Man. Machinery is being erected at the Cash Entry mine in the Cerillos.

CARLISLE GROUP.—Southwest Sentinel, June 16: The owners of the Carlisle group of mines in Steeple Rock district, have made arrangements to develop the properties. The group is comprised of the Center, Pennsylvania and the Star of the West. Work will be pushed with earnestness and vigor. Judge A. S. Potter we learn will superintend the workings and select a place where ground will be broken. Should the owners meet with their anticipations in striking large bodies of mineral, it will take considerable coin to purchase the properties. The Carlisle lode is absolutely the finest looking mine in the great Southwest. The Thicket mine, two miles north of Brennen's 76, is proving to be a very valuable property. The main shaft is now down 85 ft and has 300 tons of first-class carbonate ore on the dump. The rock assays all the way from 20 ounces to 670 ounces in silver per ton. The formation and contact is about the same as that on Mr. Brennen's celebrated mine, and there is no doubt but that when as fully developed it will prove to be equally as good property. The mine is owned by Samuel Eckstine, Messrs. Learned, Roach, and Stevenson.

OREGON.

MINING NOTES.—Jacksonville Times, June 16: A prospector has found a promising silver ledge near Ashland. Klippel & Keaton are digging a new ditch to bring water on their Poorman's creek diggings. Wm. Selph and Mr. Cole are now prospecting for quartz in the Blackwell district and are sinking a shaft at present. Thos. Chapman, of Josephine county paid Jacksonville a visit Monday, from whom we learned that the season is at an end with most miners. Considerable mining is being done near the mouth of Beaver creek, in the Siskiyou mountains. Patterson Bros. have a hydraulic in operation there, DeLamater & Newman, who own first-class mines near Kerbyville, have cleaned up. They made a satisfactory run, although water was not as abundant as usual. D. Steckel, of Wolf creek called this week as usual. He informed us that the Portland Co. by whom he is employed washed off a large piece of ground that is now being cleaned. Crushing has been suspended at Welch & Ross' mill in Willow Springs precinct, owing to the scarcity of water. About three tons of rock from the John Roten ledge on Kane creek was crushed and prospected even better than anticipated.

Have Your Claims Patented.

That we, as a mining community, are on the eve of new conditions, cannot be denied. The incoming of the railroad with its revival of old interests and the creation of new ones, will enlarge, change and modify present business relations largely, and give strength and impetus to long flagging powers. With an increase of business there will naturally be a clash of interests. A new race of men will follow the track and spread themselves throughout the mines. Among these will be numbers with whom might makes right; others, keen-eyed, shrewd and bold, will discover defects and take technical advantage of such shortcomings. The history of every mining camp on the coast has been one of contention, litigation, violence and fraud, in the matter of the settlement of the mining titles. Titles that seem perfect now, because they pass unquestioned, will assume a different aspect when subjected to the critical test of legal investigation, or perhaps submitted to the decision of an unlettered jury, whose minds are swayed one way or another by the eloquence or chicanery of lawyers. "In time of peace prepare for war," is an ancient adage. Patents that may now be obtained with ease, will be rendered more difficult in time, when the county becomes full of aggressive, active men thirsting for wealth and determined to war for it at every possible point. One man will not be allowed, peacefully and unquestioned, to hold dozens of locations, from year to year, unworked and unpatented. With or without right, these claims will be invaded, "jumped," and possession held at the mouth of the shotgun, unless the owner can show a clear and perfect patented title to it. This state of affairs is bound to come. The easy-going, indifferent conditions now existing, cannot always last. Now, therefore, is the time to make application for a patent to secure perfect and undisputed patent title to those claims which are deemed of sufficient value, and any claim that is not worth the cost of a patent, is valueless for any purpose whatever. A patent fixes definitely, for all time, the question of ownership, and places its holder above the reach of blackmailers, who ever lie in wait to assert a claim to mining property when it is approaching a sale. Capitalists are loth to invest money in claims that are unpatented. They have had a hard and bitter experience in the purchase and holding of mere locations, and are seldom tempted to invest in them unless they discover some unusual merit, for which they are willing to take the chances. The experience yet to come to our miners will demonstrate the truth of this statement.

Already have we heard of two individual cases where property in this county could have been disposed of for most respectable sums, had the same been perfect in title. One thing is certain, that no man able financially to purchase a mine, will do so as long as there is a cloud hanging over it. Lawsuits can be more easily obtained than by being bought. It is safe to say that many a one who now rests in financial security as to title, will be surprised in the future to find that when he is about to realize upon his property, that he is balked by an "outstanding title." This can hardly fail to be the case where there have been so many locations and re-locations made, running through a series of years, and the question as to the legality of re-locations resting in the mouths of men who, for a valuable consideration, may remember this or that state of facts. We cannot state this necessity too strongly or argue the matter with too great a force. We know what the future must develop, and we warn and admonish the holders of mining claims that this is the acceptable time for obtaining patents to their ground. We do not desire to prophesy evil, but the logic of events point in the direction we have spoken of. We cannot hope to escape the dangers, vicissitudes and experiences of other places, situated as we are. Human nature has not put on many changes recently, and this climate has no elements to repress and hold back the grasping spirit of men to whom gold is a God.—*Ingo Independent.*

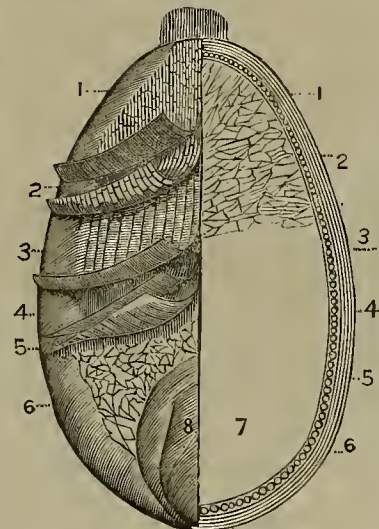
RUNNING BY WATER POWER.—Everything being in readiness the water was turned on at the Idaho mill on Friday afternoon, and has since been going without interruption. The change of connection from steam to water was made in less than an hour, which was speedy work. With 70 inches of water under 450 feet pressure 35 stamps are driven with ease, and as satisfactorily as done with steam. The wheel used is the Pelton, 6 feet in diameter, and it is found that over 90 per cent of the power of the water is obtained, or as much as was shown at the experimental trial of the wheel made several weeks ago. The water power connections for doing the hoisting and pumping will be completed within ten days.—*Grass Valley Union.*

CARSON AND COLORADO RAILROAD.—The end of the track is six miles south of Chrysopolis, and within eight miles of Independence. Within a week it will be at Hawley, on Owens lake, about four miles south of Swansea, and directly opposite Cerro Gordo district, which is distant about five miles. Hawley will be the temporary terminus and will be a very important station. In addition to Cerro Gordo, Darwin and Panamint, situated respectively twenty-four and fifty miles east, will receive their supplies through this point. A number of mines in these districts will resume work, and a great deal of business will be done this summer.

The Grain of Wheat.

Even in the hurry of harvest it will be well to pause a moment to consider the structure of a grain of wheat. It is seldom, however, that we do stop from our hurried work to think of the material we are handling. Rather is the golden grain treated as we would sand or gravel, merely with a thought of its market value. But the kernel of wheat is an interesting study. A grain of sound ripe wheat in itself, is a small thing; but let us examine it and see what it contains. In form it is nearly egg-shaped, with a longitudinal groove on one side; if we sever it horizontally the sections are heart shaped. The accompanying engraving, showing a longitudinal section of a grain of wheat enlarged sixteen diameters, gives a clear idea of its structure. The outside layer or cuticle is mainly composed of silica—the mineral base of sand—which is rendered soluble by potash in the soil, and is carried by the little veins of the wheat plant and deposited with the woody tissue. The bran consists, first of the epicarp (1) or outer coat of longitudinal cells; next the mesocarp (2) or inner coat of longitudinal cells; and the endocarp (3) or the coat of transverse cells. This triple coat, while indigestible to man, (yet highly relished and valuable as cattle food,) is perfectly adapted by nature for the reproduction of the plant, performing the function of circulation for the seed, without which it could not develop a new plant, or even germinate. At the upper end of the kernel is seen an appendage, consisting of minute filaments, or hairs, that are absorbents of moisture in the earth, and which convey it to the outer coats, and thus perform an important office in aiding germination.

Returning now to the coats of the grain, No. 4, is the epispem, or outer seed coat, and No. 5, the tegmen, or inner seed coat, which contain a substance called cereoline. No. 6 is the per-



The Wheat Grain Analyzed.

isperm—a single layer of large cells filled with gluten and nitrogenous products, the most nutritious portion of the grain. Pure gluten is, for the most part, composed of proteine, a substance which forms the basis of the nitrogenous compounds, albumen, fibrin and caseine, besides sugar, gum and soluble albumen. (Gluten is not, however, limited entirely to this layer (No. 6), as it is found distributed through the interior of the berry, as well as in the bran. No. 7 is the endosperm, or large cells, which form the central portion of the berry, consisting mainly of starch in minute granules.

The phosphates of soda, lime and magnesia are found about the center of the kernel, where the outer layer turns into the berry, forming an inner heart-shaped section. These are the bone and brain-making elements of wheat, and the greater the quantity that can be obtained or preserved in the reduction of the grain the more valuable is the flour.

The chit, germ, or embryo, is seen at No. 8, near the large end of the kernel, and in the crease. It is rich in gluten, and contains also starchy oil, etc. Over the germ is a thin scale-like pellicle, easily removed with the thumb nail, revealing the little germ containing oil beneath.

While the illustration and description given show what the general structure of a grain of wheat is, it must not be supposed that the gluten and the starch are strictly defined layers. They are mingled together, the gluten largely predominating towards the bran, while starch forms much the largest portion of the center.

Nature's provisions for the perpetuation of vegetable, as well as animal life, are perfect; her laws are harmonious, and at the same time inexorable. She requires perfect conditions if the highest results are to be obtained. In the degree that such conditions are present, will be the measure of excellence found in each and all of the myriad forms of life that abound on the earth. In a grain of wheat, nature furnishes the constituents required by the delicate plant that springs from the germ under the friendly influence of moisture and warmth in soil, and supplies to both the radical and the plumule, the populum necessary to their existence until they

have gained sufficient vitality to lay hold of the food she also supplies in the earth and the atmosphere for the growth and maturity of plant life.

Nevada and Her Merits.

The State of Nevada is under a temporary cloud; but there are some things about it which must not be forgotten; some things, says the Salt Lake Tribune, which sharp business men should always keep in sight. It has not yet been a State 20 years; it has never contained more than 65,000 people; it has been discriminated against and robbed by transportation companies as no State ever was before; but it has yielded more gold and silver, and paid more dividends from its mines than any other three or four States and Territories combined, except California. Its people have purchased from other States and Territories more material than the same number of men ever purchased in the same length of time. And it has paid in gold and silver for all it has bought. The bullion of Nevada, between 1860 and 1864, acting as a lever in the national finances, did more to uphold the credit of the country than did the product of the most powerful Eastern State; and because of that product and the product of California and these interior Territories, those in power had the material with which to meet the country's interest obligations; the courage to commence to pay the mighty debt, and finally to bring about redemption and a reduction of 50 per cent in the rate of interest. A State which has been so important, which still remains with but two or three exhausted mines, and with plenty of others which have never yet been any more than surface-scratched, should not be dismissed with a sneer. It must be borne in mind, too, that a great many of the camps of Nevada have been worked from 100 to 250 miles from the railroad, and that when the railroad was reached the fare was eight cents a mile and freights were in the same ratio. Nevada has no terminal points, and hence it costs three times as much to send anything to any point in Nevada as it does 300 miles further east or west. If under such circumstances Nevada has been made to pay, there must be some unusual merit in its mines, and the promise of what it is to accrue to the first railroad that penetrates its southern districts is a matter which sharp railroad men should keep in mind. Its gold and silver is not its only minerals. We of this place are rather proud of the fact that by evaporating the water from six or seven barrels filled from Salt Lake there remains a barrel of salt. In Southern Nevada there is a mountain of solid salt, from which the moisture was long ago evaporated, and it is as white and pure as the cleanest Eastern table salt. There are besides vast beds of iron, borax, gypsum, sulphur, copper and other minerals which are more used than either silver or gold. And two-thirds of all that region of more than 90,000 square miles is naturally tributary to this city. If none of the existing railroads are ready to begin the work of extension in that region, the men of this city should commence a narrow-gauge road to the southwest. One million of dollars would build the first 120 miles. This could easily be mortgaged for enough to build 120 miles more. That much road would command Deep Creek, Osceola, Pioche, Bristol, Ward, Taylor district, White Pine, Reville, Hot Creek, Tybo, Belmont and as many more smaller districts, all of which want cheap machinery, cheap fuel, cheap labor and cheap supplies of all kinds. Twenty per cent. on the cost would be \$400,000 per annum, or a trifle over \$1,000 per day. Ten car loads of freight at \$10 per ton and 20 passengers per day at three cents per mile would be ample to pay expenses and give to the owners 10 per cent. on their investment. The truth is, such a road would at fair rates pay for itself, clear of expenses, once in every three years. Our sharp men should make a note of these facts, and the holders of real estate should not forget that the road, if built, would have the effect to just about double the real value of their property.

USEFUL NOTES ON WATER.—One gallon of distilled water weighs ten lbs.; one gallon of sea water weighs 10.32 lbs.; 1.8 cubic feet of water weighs 100 lbs.; 36 cubic feet weigh one ton, equal to 224 gallons; one cubic foot contains six and one-fourth gallons. [The English standard, or Imperial gallon, is here referred to.] The average daily consumption of water in towns is 16 to 20 gallons per head. In pipes, the square of the diameter in inches equals pounds weight of water per yard. Example: An inch pipe holds nine lbs. per yard. One hundredth inch of rain is about one ton weight to the acre. A nominal horse power for a boiler requires one cubic foot of water per hour. Circular apertures are most effective for discharging water, since they have less frictional surface for the same area. The vena contracta is the best form of orifice for discharging water. The ordinary speed to run a pump is 80 to 100 feet per minute. The pressure in pounds per square inch of a column of water is the height of a column in feet multiplied by 5.34, or, for an approximation, one-half pound pressure per square inch for each foot of height. Water, in flowing through an aperture, has a velocity equal to that acquired by a heavy body falling freely from a height equal to the distance between the center of the aperture and the surface of the water. Doubling the diameter of an aperture increases the flow four fold.

Campo Seco Copper Mine.

The village of Lancha Plana is situate some fourteen miles southwest of Jackson, and on the north bank of the Mokelumne river. While its variegated resources, consisting of deep gravel mines, coal and copper lodes, are still excellent, cozy cottages, surrounded by productive orchards, gardens and grain fields, greet the eye. Numerous abandoned reservoirs for water, now filled level with the debris of the horrid hydraulic miner, yield continual fat crops of alfalfa and clover. In the absence of a hotel, the weary traveler is pleasantly entertained by Mr. J. Maroon and lady, with all the home comforts that pertain to intelligent farm life.

Crossing the river on a suspension bridge, a short distance east of the village, a well graded wagon road leads to the Campo Seco Copper mine, distant one and one-half miles. The matrix of the vein is slate; course, west of north; dip of vein, east, at an angle of about 60°. The incline is 200 feet deep. The ore in the lower level reaches twenty feet in lateral extent and has been stoped about seventy-five feet in a linear direction. A three foot Knight's wheel with sixty foot pressure gives the motive power for hoisting and a four-inch (arrat's) plunger pump. Some 800 tons of assorted ore were shipped to San Francisco. The low grade residue on dump, some 700 tons, are now being worked at the company's reduction works, a short distance below the mine. The reduction works were substantially constructed to reduce copper ores by M. B. Dodge's methods and patents. Soda, obtained from gas works, is mixed with the ore and then fed to the rock-breaker. Thence a pulverizer receives the ore, discharging it through a screen. The screenings are carried upwards by a belt, to which buckets are attached, dumping the material into a hopper which feeds the revolving roasting furnace. This roaster is a huge cylinder, 28x8 feet, making two and a half revolutions per minute. The cylinder weighs some twenty tons and when lined inside with fire-proof brick and in operation, about fifty tons. A brick furnace under the upper end of the cylinder, which is slightly inclined from the horizontal, supplies the heat required for roasting. At the lower end a continual stream of pulverized, roasted ore is discharged, thence passing to the leading vats, and ultimately to precipitating tanks. A heater supplies the vats with steam. The rock-breaker, pulverizer and revolving furnaces are propelled by a four and a half foot Knight's wheel with a pressure of 160 feet. The works have a capacity of reducing twenty tons of ore in twenty-four hours. Mr. C. Berger is superintendent.

Wallace, the eastern terminus of the San Joaquin & Sierra Nevada railroad, is within six miles, westerly, of the mine. This belt of copper lodes extends northerly through a portion of Amador, and southerly through Calaveras. I was shown fine specimens of copper ore and native copper, taken from the extensions of the above mine years ago, but the pursuit was abandoned on account of the then low price of copper.—*Cor. Amador Dispatch.*

The Violin.

We have recently examined a violin made by C. W. Powers, of this city. The wood of the top is about forty years old, and was taken from the broken spar of a sailing vessel; the back of the violin is of fine Eastern maple, selected by White, the well-known violin maker of Boston—the whole being put together and finished in a masterly manner, showing unusual skill in mechanism and acoustics. Judging from its tone it would bear comparison with many a reputed "master."

The violin has come to be looked upon by many connoisseurs as a fathomless, complex scientific problem. Indeed, it is little understood, mainly because no practical knowledge can be gained from books on the subject. Its unprofitableness as a study prevents it being generally pursued by those devoted to studying dead arts, and it would seem destined to remain shrouded in mist. To the theorist, a lack of knowledge only lends an additional charm and fascination, to the already entrancing effect of the "magic wand" in the hand of the skilled artist.

There are several amateurs in this city who display considerable skill in the construction of the violin. An hour is well spent in the workshop of Captain D. C. M. Goodsell. Having had ample time and means, he has applied himself assiduously to this pleasurable work, for the past twenty years, not a day passing that he has not given it some attention. During that time he has gained much knowledge relative to sound, and its distribution in the violin. A "chef" would hardly escape his eye unrecognized, yet his knowledge is likely to remain with him—and the same can be said of Genunder, of New York, and others, unless they choose to transfer their deductions upon paper, for the benefit of those to follow them.

Science, as well as time, has demonstrated that the wood in violins needs to be protected by varnish; not alone from dampness, but natural decay. The oil of varnish penetrating the wood and leaving an elastic, outward surface, arrests that decay as nothing else has been shown to do, and with age mellows and intensifies the tone vibrations—a fact which is often overlooked, or disregarded. Proper varnish is necessary, however, for this result; the finest varnish even, used in manufactories will not do for this purpose. Much more might be said to interest the lover of the violin in this "far" western coast, but for the present this must suffice.

Sierra as a Mining County.

Ever since 1850, Sierra has ranked, says the *Sierra Tribune*, among the very richest mining counties of the State. Of course there is no means of ascertaining the annual yield of the mines of this county since that period. Were we able to present such statistics, the figures would not only verify our assertion, but would even astonish old Californians, familiar as they are with stories of the immense wealth which has been unearthed amid the ridges of the Sierra Nevada. From the period mentioned this region has been occupied by a large population of hardy miners, who have not only found profitable employment in the river beds, ravines and hills embraced within the area of the county, but many of them have retired as millionaires from the hard labor of mining, or else entered into mercantile or other more profitable pursuits. There are prosperous merchants and bankers residing and doing business in the county now, worth their tens of thousands of dollars, who came here poor men and made the foundations of their fortunes by hard labor with pick and shovel. Instances of this character are so numerous that the conclusion becomes inevitable that Sierra county has afforded the most profitable field for mining labor in the State. And what it has been in the past, it still is. The main wealth of this country remains as yet untouched in gravel deposits, deeply imbedded in the hills, and in quartz lodes which traverse almost every mountain's side. It certainly requires much patient and almost superhuman labor to develop the gold deposits of these hills, but the labor is being applied, and will yet be applied with still greater force. The rich hill diggings of Fir Cap, Howland Flat, Gibsonville and Port Wine and vicinity, have not been surpassed by any in the State, and they still promise to yield vast stores of the precious metal for years to come. The quartz interest of this section, yet in its infancy, is attracting the attention of capitalists abroad, and will soon loom up in gigantic proportions. Comparatively speaking, but little has been done toward developing this interest, yet the enterprises of this character, which are being prosecuted, have proved remunerative in the highest degree. This interest is sure to be of great importance to this county at an early date, and will form a solid basis of permanent prosperity. When the facts to which we allude become more widely known, a new industrial population will be attracted hither, and the business and prosperity of Sierra county will again loom up, rivaling the palmy days of the past.

Queer Ore.

A knowledge of mineralogy obtained from the books is very good as far as it goes, but practically it does not go very far. More than this, in this country of ours of a thousand and one singular formations, the miner, experienced in every day work, stumbles frequently upon rock the character of which he can tell no more about than if he had never mined a day in his life. A case in point happened the other day at the Eureka Con. reduction works, at which tribute ores and simple lodes are received from all over Southeastern Nevada. Some ores had come in from Reveille District, Nye county, some 60 miles southeast of Tibo, and from Morey, which no miner in this district would stop on the hills to look at for a moment. The rock from Reveille especially seems wanting in every aspect of what is called ore in these parts. To use Bob Zeile's expression, it looks like a mixture of lime and brick-bat. But this very stuff, some six tons, was tested and found to average over \$2,000 per ton in silver and gold, chiefly the former. Some experts came down to the works and Uncle Zeile showed them the pile from which an assay had been made, with the remark: "What do you think of this sort of stuff? I don't think there is anything in it." They all agreed with him, of course, and went away with the impression still strong in their minds that what they don't know about ore is not worth knowing.—*Eureka Sentinel*.

THE FRESNO FOOTHILLS.—"Vic," a correspondent of the *Chronicle*, writes as follows from Coarse Gold Gulch: Along the eastern boundary of Fresno county, or that portion embracing the foothills of the Sierra Nevada mountains, lies a region of undiscovered mineral wealth and agricultural possibilities, neither of which have received any great amount of attention. The early influx of prospectors to the coast brought its pro rata of the "pick-and-pan" brigade to this isolated region. An honest and dishonest, shrewd, keen-witted mob, they came and went, leaving monuments of their industry along gulch and ravine in heaps of gravel and sand. There is now some fine gold being sluiced and rocked, and occasionally a nugget of considerable value is found. The outcropping of the quartz, in many places gold-bearing from the surface, is almost continuous from the Fresno to the San Joaquin river. A few quartz mills of small capacity are being run upon ores already extracted. Many horse arrastras are running with good success, but unless the ores thus worked are of great richness nothing but a living results from this mode of reduction. Thus the mineral wealth of Fresno county is still an unknown quantity and awaits an investment of capital.

USEFUL INFORMATION.

Ancient Mortar.

In examining the other day, says a contemporary, the remains of Old Sarum, an old Roman fortress in the south of England, near Salisbury, we were surprised at the remarkable strength of the mortar by which the flints and sandstones were held together. We find the mystery explained in the following paragraphs from an authority on the subject:

"The ancient masons were so very scrupulous in the process of mixing their mortar that it is said the Greeks kept ten men constantly employed for a long space of time to each basin; this rendered their mortar of such prodigious hardness, that, *Vetruvius* tells us, the pieces of plaster falling off from old walls served to make tables.

"It was a maxim among the old masons to their laborers that they should dilute the mortar with the sweat of their brows; that is, labor a long time, instead of drowning it with water to have it done the sooner.

"The weakness of modern mortar, compared to the ancient, is a common subject of regret; and many ingenious men take it for granted that the process used by the Roman architects in preparing their mortar is one of those arts which are now lost, and have employed themselves in making experiments for its recovery.

"But the characteristic of all modern artists, builders among the rest, seems to be to spare their time and labor as much as possible, and to increase the quantity of the article they produce without much regard to goodness; and perhaps there is no manufacture in which it is so remarkably exemplified as in the preparation of common mortar."

ANALYSIS OF THE ORANGE.—The *Boston Journal of Commerce* publishes the following result of the analysis of a medium sized orange, purchased in Faneuil Hall market: The skin weighed 67.5 grams, which is 23.33 per cent. The seeds weighed seven grams, which is 2.84 per cent. The pulp weighed 182 grams, which is 83.83 per cent. The skin contained in 100 parts: Water and volatile oil, 78; organic matter, 21.30; ash, .64. The seed contained in 100 parts: Water, 50; organic matter, 48.64; ash, 1.36. The pulp contained in 100 parts: Water, 90.90; organic matter, 8.68; ash, .42. The pulp contained in 10 parts: Grape sugar, 4.3; cane sugar, 4.2; in free acid, 1.5. The free acid consisted of about equal parts of malic and citric acid. The ash constituents of the orange were as follows: Potash, 38.7; soda, 7.6; lime, .23; magnesia, 6.5; ferric phosphate, 1.7; sulphur, 2.9; silica, 6.2; phosphoric acid, 13.4. A gentleman in Manchester claims to have succeeded in applying orange peel to a very useful purpose. Orange peel dried in or on an oven until all the moisture has been expelled becomes readily inflammable, and serves admirably for lighting fires or for resuscitating them when they have nearly gone out. Thoroughly dried orange peel will keep for a long time, and might be collected when the fruit is in season and stored for winter use.

PROTECTING IRON FROM RUST.—A new process for preserving iron is described by *Les Moutres*. It consists in treating the casting with dilute hydrochloric acid, which dissolves a little of the metal and leaves a skin of homogeneous graphite holding well to the iron. The article is then washed in a receiver with hot or cold water, or cooked in steam, so as to remove completely the chloride of iron that has been formed. Finally the piece is allowed to dry in the emptied receiver and a solution of caoutchouc, gutta percha or gum resin in essence of petroleum is injected and the essence afterward evaporating leaves a hard solid enamel on the surface of the iron work. Another plan is to keep the chloride of iron on the metal instead of washing it off, and to plunge the piece into a bath of silicate and borate of soda. Thus it forms a silico-borate of iron, very hard and brilliant, which fills the pores of the metal skin. As for the chlorine disengaged, it combines with the soda to form chloride of sodium, which remains in the pickle.

THE FUTURE OF THE COTTONWOOD.—The despised cottonwood may yet become the most popular as well as the most valuable tree. Late inventions and discoveries have revealed the fact that the finest polish and strongest household furniture can be made out of paper. It can be pressed so hard that no instrument short of a diamond can scratch it, and it can be given the finest shades in imitation of wood, and produced cheaper than walnut, mahogany or ebony. And late discoveries in paper making establish the fact that cottonwood makes the whitest and strongest fiber pulp yet manufactured out of wood. There are vast quantities of pulp imported, and some newspaper men are clamoring for it being done free of duty. Paper mills in Delaware, Pennsylvania, and other Northern States, are shipping thousands of cords of poplar wood from the Chowan river in North Carolina, one mill in Delaware contracting for 30,000 cords.

HOW TO TEST FLOUR.—In testing flour it is always a good sign to have a yellow tint, but if it is very white with a bluish tint it is not so good, because it lacks the gluten. Next examine its adhesiveness by wetting it and kneading it between the fingers. If it works dry and

elastic it is good; if it is soft and sticky it is poor. Flour thrown against a dry, smooth, perpendicular substance, such as a board, will show whether it has life in it or not by adhering in a lump, or, if after squeezing it in the hand, it retains the shape from pressure, it is a good sign. Gluten will turn red if cochineal is applied in a thin solution, so that a person can easily tell how large a quantity of gluten there is in wheat by using cochineal.

THE GLUE POT. There are a great many times, truthfully says one of our contemporaries, when a glue pot in the house is a "well spring of pleasure," and is an economical investment, especially when one of the kind here described. Buy at a tin shop one small tin cup, costing five cents, and a large one, costing about ten, in which the smaller one can be set; five or six cents' worth of glue will mend a great many broken articles, or will fasten the things that have become unglued. Put the glue in the small cup with a little water; put boiling water in the larger one, and set the glue pot in it; in a few minutes the glue will melt and be ready for use.

WATER-PROOF LEATHER.—E. Pollack has the following note on water-proof leather: The fat having been removed, the clippings are mixed with starch paste, some gum arabic, and one per cent of alum, and pressed into plates. It is then treated with a solution of soda soap, and pressed again. Thus it becomes impregnated with fatty aluminous compounds. Greased leather clippings are first to be treated with sodium silicate of caustic. The resulting soap is then rendered insoluble by impregnating with alum or zinc sulphate.

ETCHING LIQUID FOR STEEL.—Mix one ounce sulphate of copper, one-half ounce of alum, and a teaspoonful of salt reduced to powder, with one gill of vinegar and twenty drops of nitric acid. This liquid may be used for either etching deeply into the metal or for imparting a beautiful frosted appearance to the surface, according to the time it is allowed to act. Cover the parts you wish to protect from its influence with beeswax, tallow, or some similar substance.

TO PROTECT BRICK WALLS.—Bricks are very porous, and paint very expensive on such a surface. Still brick houses with unprotected walls are always damp after a protracted rain. A cheap preparation that would prevent the water from permeating the brick might be made by mixing a thin wash of Portland or Rosendale cement, with preference for the former. It may be applied in the same way as whitewash.

PAINT FOR KITCHEN WALLS.—For a paint or varnish suitable for kitchen walls, that will wash or can be cleaned in some easy manner, where the walls are not hard finished, use linseed oil paint, that is, any colored metallic oxide, graded in linseed oil.

GOOD HEALTH.

Fireside Chats on Health.

[BY HILDA DELESTHER.]

I noticed in the *SCIENTIFIC PRESS* of May 5th, the mention of a possible cure for neuralgia by the eating of raw oatmeal soaked in milk. If oatmeal taken in that way would keep the bowels open it might cure many aches and pains, for constipation brings on so many diseases. But the item I refer to reminded me of the directions given me by an experienced nurse for making oatmeal gruel for my sick boy.

"No, don't cook it much," said she, "the more you cook it the more binding it will be. Let it just barely come to a boil, then turn it out and take it up to him. Don't strain it, make him eat the meal and all if you want to cure constipation. I suppose he won't relish it so well when cooked so little, but then it isn't bad for a medicine, and anybody could get used to it so as to like it after a while, I reckon."

This was a new doctrine to me, for when I first learned about making oatmeal mush I was duly impressed by my teacher as to the desirability of cooking it two hours or more; so I supposed that half an hour for gruel, after it began to boil, was none too much. But now I think I have had some proof that mush is more healthy when cooked only half an hour. I wish some of your Scotch readers would tell me how it is prepared in Scotland.

Night Sweats.

A simple remedy for night sweats, which I have tried on more than one occasion, is the drinking of cold sage tea, a few swallows at a time, during the day and evening, and did not have to use more than one or two cups a day for a few days, before the cure was effected. This remedy was given me by a physician, but whether it would cure a case of long standing I cannot say, but think it worth trying.

Vomiting.

As the fruit comes on, if your children are taken with pains in the stomach by eating unripe or overmuch fruit, give them lukewarm water until they vomit. Or, if they are taken with vomiting, it is a sure sign that there is something in the stomach that needs to be thrown off, and the vomiting will often be stopped the sooner if you assist in the cleansing process by the free use of warm water, instead of being frightened and dosing them with all sorts of medicine to stop it. For several

years I never gave my children a drop of medicine; sometimes they would ask for the drink of warm water or a wet compress at night, if they felt unwell. Of course I paid attention to their bathing and tried to give them plain good food to eat, at regular times. The vomiting of infants is often caused by too frequent nursing. Nurse or feed them once in two hours for the first two weeks, then once in three hours; then, if they cry, you may know it is not because they are hungry. I am sure they are sometimes misused, when their stomachs are already overloaded, just because they cry.

Diarrhea.

When I was quite a small girl, I read that eating from three to six strawberry leaves would cure this disease, and after that if I was ever taken sick in that way, instead of complaining to my mother I used to gather and eat my strawberry leaves, and was very soon well again. Since coming to California I have used cultivated instead of wild strawberry leaves. I have met people who refused to eat green corn because it produced the same effect upon them as a dose of physic; but they would take the physic and suffer the consequences with all the equanimity possible. Let them try the green corn again. I believe they will find themselves the better for it.

Grape Cure.

I have heard several times about the grape cure as practiced in Germany, but can learn nothing of the method. I would be glad if any one knowing about it would tell us what disease it cures, and whether patients are allowed any other kind of food, or do they live on grapes alone? And do they swallow the skins or seeds of the fruit? California has such delicious grapes, let us make all the good of them we can.

Learning to Swim.

The great difficulty to the beginner is to learn to keep the proper position of the body after attaining it. This difficulty can only be overcome by using the proper stroke after having placed the body in the correct position.

In the use of the arms, the only direction that can be given is to remember that when the arms are thrust forward at the beginning of the stroke, such positions of the elbow and hands should be taken as will make the least resistance to the water. To accomplish this, the hands should be placed palm to palm, and the elbows made to come quite close together, starting them from under the chest. In making the effective part of the stroke, our object is to get a forward motion only. The arms and hands should be so placed as to produce the greatest resistance upon the water. To accomplish this, the palms of the hands should be thrown outward, and the plane of the direction of the stroke of the arms made parallel to the surface of the water.

The most important and the most often defective point in swimming is the mode of using the legs. It would be well for a beginner to observe the swimming of a frog, for undoubtedly the same method of using the legs should be adopted by man as is displayed in the model swimming of that amphibian.

In analyzing the stroke of the frog, we notice that there is no vertical motion; the whole direction of the force is in a plane exactly horizontal, and is accomplished by virtually opening and closing the space between the knees—offering the sole of the foot as a resistance while kicking, and placing the feet in a position of least resistance while recovering.

In accomplishing the first of these conditions—the opening and closing of the space between the knees—the knees should be thrown out, and the contraction of the legs made slowly, in order to cause as little resistance as possible to the headway already attained.

It will be found that, if we alternate the stroke of the arms and legs by giving propulsion with one while recovering with the other, a more constant buoyancy will be attained, and for long swims it will be found far less fatiguing.—*Popular Science Monthly*.

THE NOVEL-READING DISEASE.—Physicians are familiar with a complaint which, although sufficiently specific, has yet no name of its own. The patient suffers from an alarming and morbid thirst, and consumes a perfectly fabulous amount of fluid, almost always of an unwholesome nature. Tea, in a highly diluted shape, raspberry vinegar and water, soda water, or some other such abominable mess, is taken by the gallon, and the unnatural craving is stimulated by indulgence. Wholesome food is refused; no exercise is taken; and the patient finally sinks into a flabby and sickly condition, which nothing but severe and determined treatment will shake off. This dropsical habit of body finds its exact analogue in the species of mental dropsy, which is produced by over-indulgence in three-volumed novels. This terrible complaint is one of the worst evils which modern civilization has brought with it. Its progress is gradual, very insidious, and often almost imperceptible. At first all that is noticed is that the sufferer is apt to be found bent over a novel at unnatural hours. Soon, however, the disease becomes more pronounced, and in its worst stage novels are read through at the rate of three or four, or even five, a week, or, at an average, in a severe and chronic case, of some two hundred and fifty or three hundred a year.—*Herald of Health*.

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SAN FRANCISCO:

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TABLE OF CONTENTS.

EDITORIALS.—Timbering in Mines—No. 14; Lower California Placers; Booming, 417. Passing Events; New Gold Discoveries; Miners' Accident Relief Societies; Knowledge of Working Miners; Lead, 424. The California College of Mines, 425. Patents and Inventions; Notices of Recent Patents, 428.

ILLUSTRATIONS.—French System of Timbering for Main Levels, 417. View of Berkeley, the University of California and San Francisco Bay, 425.

MECHANICAL PROGRESS.—Hardening and Tempering Steel; Modern Guns and Projectiles; Fast Work in a Carriage Shop; New Adaptation of Electricity; Drilling Glass; Fire Bricks from Flint, 419.

SCIENTIFIC PROGRESS.—Tornadoes; Shall we Smell by Telephone; What Causes the Timber Line; Twinkling during Auroras; Conductivity of Carbon; The Recent Eclipse Observed; Motion of Sun Spots; Movements of Submerged Bodies; Pressure Battery; More Fossil Discoveries at Carson, 419.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends and Bullion Shipments, 420.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Idaho, Montana, New Mexico, Oregon and Utah, 420-1.

USEFUL INFORMATION.—Ancient Mortar; Analysis of the Orange; Protecting Iron from Rust; The Future of the Cottonwood; How to Test Flour; The Glue Pot; Water-Proof Leather; Etching Liquid for Steel; To Protect Brick Walls; Paint for Kitchen Walls, 423.

GOOD HEALTH.—Fireside Chats on "Health; Learning to Swim; The Novel-Reading Disease, 423.

NEWS IN BRIEF.—On page 423 and other pages.
MISCELLANEOUS.—The Constock Lode; The Anti-Miners' Attack Upon the Drill Miners; Carbonate, Colorado; Copper in Arizona, 418. Have Your Claims Patented; The Grain of Wheat, Nevada and Her Merits; Campo Seco Copper Mine; The Violin, 422. Sierra as a Mining County; Queer Ore, 428.

BUSINESS ANNOUNCEMENTS.

Mining Machinery.—Etna Iron Works, S. F.
Assessment Notice.—Gould & Curry M. Co., S. F.
Dividend Notice.—Bulwer Con. M. Co., S. F.

Passing Events.

The breakage of the big mining dam on the Yuba, elsewhere fully alluded to, is a disastrous matter, not only to the company and those directly injured, but to the mining interests. The mines to which it was necessary are our largest gold producers, and of course that source of bullion product is stopped for a time. In a general way it lessens confidence in dams, though that should not be the case, as such accidents are liable to occur to any structure.

The news of a rich mining field in Lower California, full details of which we give in another column, will be read with avidity. Like all rich things, however, there are serious drawbacks.

In the mining regions work is being vigorously prosecuted in all directions, and generally prospects are very favorable for a full yield this year. So many new mines are opened that it is difficult to even keep track of them; yet our "Mining Summary" gives details of all such things.

COPPER IN LIVERPOOL.—Late quotations of copper in Liverpool are: Chile bars, good ordinary brands, £63 10s. to £63 15s. Ore, 12s. 4½d. per unit. The total visible supply is 48,519 tons fine against 51,755 tons on May 1st.

LEAD in Liverpool is selling at £12 17s. 6d. to £13 for English and £12 12s. 6d. per ton for Spanish.

THE deepest mine in Colorado is down 1,400 feet. It is called the California.

New Gold Discoveries.

A Rich Mineral Belt in Faja California, Mexico.

For several years it has been well known that very rich copper mines existed near San Borgia, Baja California. The ore from these mines not only carried from twenty-five to ninety-five per cent of copper, but also from \$8 to \$25 in gold and \$15 to \$250 per ton in silver. There is but very little doubt that the sixty tons of ore bought by the Revere copper works in Boston, twenty-two years ago, and from which white copper was made, equal if not superior to the celebrated "Pang tang" of the Chinese, came from the Morales or San Borgia copper mines. It has also been well known that the richest silver ore ever found in Mexico, was accidentally discovered between San Borgia and Cedros Island shore, by some shipwrecked sailors, and although thirty miles from water, wood or grass, the sailors returned and proved the truth of their reports by showing the ledges or veins, from whence they took there. Within a year a Californian discovered a very rich gold quartz mine, adjoining the San Borgia or Morales copper mines, from which he took \$8,000 in a few days, by pounding the ore or rock in a hand mortar; and his companions or associate miners took their \$5, \$10 and \$20 per day from the same vein. Just how gold, silver and copper, each distinct and separate by itself, could exist within a stone's throw of each other, unmixed, is a mystery unsolved by the practical miner, and a question which may puzzle the geologist and mineralogist to solve. These rich discoveries led to the organizing and sending out last fall, of well equipped prospecting parties, to explore an entirely unknown country. The wet, cold winter was a godsend to them, as water and grass were found everywhere. We are now informed that these parties were at last rewarded by discovering in the last of April, the evidences of gold and finally the gold itself. At first a gulch was found, emptying into the Pacific ocean, twenty miles west of San Borgia, latitude 29°, longitude 114°, about fifteen miles in length, which was rich in placer gold. Nuggets from \$8 to \$360 were found. Men took

\$100 Per Day to the Man.

The gulch was found to have branches of fifteen miles or more in length. The first gold was found on the naked bed rock, made bare by the winter's floods or heavy rains. Upon careful examination it was found that the ancient gravel stream lay about two feet below the surface and that the pay streak, or bed of gravel, was about four feet thick. Subsequent explorations show that the ground or placer belt is seventy-five to 120 miles in length by thirty to forty-five miles in width, with gold in almost every gulch, canyon and ravine.

Difficulties.

No water is found, only for drinking and cooking, and this, in many cases, has to be carried on mules' or burros' backs from 5 to 12 miles, and in one case 20 miles. Twenty miles from the first discoveries there is a large stream of water which can be carried in iron pipes, and used in 20 to 25 miles of the different gulches. As found, this water soon sinks, and is lost in the loose gravel of these desert wastes. Not a stick of fuel is anywhere to be found, only a limited supply of small brush and shrubs, hardly sufficient for cooking. No grass is found, only a few weeds or plants, upon which the small native mule or burro can live. It is impossible for a horse of any kind to live in the entire region.

Distances.

It is 614 miles by land to San Borgia, 594 to the new mines, or where the discoveries were made, from San Diego, Cal., and not less than 400 miles by water from San Diego to Lagoon Heads, or 375 to Rosalia bay. From here to the mines it is about 40 miles over a desert. Small vessels, drawing not over four or five feet of water, can go up the lagoons, Manuella or Black Warrior, for 15 or 20 miles, and within 12 to 20 miles of the new gold fields, over a desert void of water, fuel, or grass. On the east shore of Manuella lagoon, nearest the placers, there used to be fresh water, but nothing is now known whether the well is still there or not. Parties going to the mines should take supplies to last them at least for six months, as not one thing can be had to eat or drink. The heat is intense, 95° to 110° daily in the shade, when there is any, and often 120°, and will continue so for 120 days to come. Water is found in the driest

seasons, from San Diego to San Fernando, every 10 or 15 miles—a distance of 403 miles—and from San Fernando to the new mines every 15 to 25 miles. In the dry season 36 miles is the longest drive to water. Just how rich or how extensive the rich portions of the gold fields will be found, is yet a question which will be solved before January. Hundreds are leaving by land and water for the mines. Parties are returning to different supply points almost daily after provisions, tools, etc., bringing one, two, six and eight pounds of good gold dust with them. This is the best evidence of the gold existing in quantities.

Caution.

Let no one rush off wildly, or without due preparation. If as extensive and rich as reported, there will be enough for all. November or December will be a much better time to go there than at present in the heated season. All the work must be done with dry washers or by fanning out the ground and dirt and leaving the gold. If as reported, the gold fields cannot be worked in six months or in five years, and the working of these placers will develop the vast copper, silver and gold mines near by, the great deposits of nitrate of potash and soda, alum, sulphur and borax, the veins of mica, manganese, spiegel and iron. Let every one wait until the facts are known by those who are already in the mines or on their way there. At least let every one think twice before they start off into such a wild and barren country. Wagons can go from San Diego to San Fernando, a distance of 403 miles over a very fair mountainous road, but no further; only burros or native mules can be used beyond.

Miners' Accident Relief Societies.

In England they now have in the mining districts, excellent institutions known as the "Miners' Fatal Accident Relief Societies," which we might with propriety form in this country. Although the survivors of sufferers by great mining accidents, involving serious loss of life, are often liberally provided for by the munificence of the public, the majority of fatal accidents result in the loss of one or two lives, and in these cases the survivors are almost or entirely neglected—a small contribution of the field club or the owners or other sources, and perhaps the burial expenses usually representing all the assistance received. The only remedy for this is a miners' fatal accident relief society supported by the miners, colliery owners, lessors and the public. Such an association not only provides for the few fatal accidents which awaken public sympathy but also for those numerous cases which do not attract attention, but which are found by experience to entail far more misery than is caused by the great colliery catastrophes. All those who are interested in movements for the relief of the bereaved and destitute will assist a society like this.

The objects of the society are to provide for the widows and children and the payment of legacies to the relatives of unmarried members who may be killed by those casualties which are of such frequent occurrence in and about coal, or other mines or quarries and a sum to defray the funeral expenses of members accidentally killed in and about the pits. This is essentially a workmen's society movement. The men all give it their hearty support. On this coast in the larger camps, some such organization as this could do much good.

ALASKA EDITION.—We shall publish a double edition of the MINING AND SCIENTIFIC PRESS next week devoted mainly to the interests of the Territory of Alaska. We shall give a fine large map of Alaska, showing the mining districts, etc., and other illustrations relating to the region. There will also be considerable information concerning the mines and mining districts, and a good deal of matter of interest to prospectors and miners generally. This special edition will be of value to all who are in search of information about our northern possessions.

The one-ledge theory has been exploded so far as it was supposed to apply to Tomahstone. The *Republican* says that the developments made in that camp tend to prove that there are three distinct formations, in which are boulders, varying in size, are met with, viz., lime, porphyry or quartzite, and the belt known as the manganese formation.

ANTIMONY is selling in England for £39 to £40 per ton for French Star Regulus.

Knowledge of Working Miners.

We have not in this country any of the science classes or colliery institutes such as exist in the mining regions of Great Britain, where the miners who work every day may learn some of the scientific part of mining free of charge if they choose. There they have these things managed so well, that any one desiring may have an opportunity to learn from good instructors, and see experiments carried on which educate him in his calling from day to day. Some of the colliery institutes offer money prizes for essays in mining, restricting the contestants. That is they offer a prize, for instance, to any one not over the grade of an overman. The object is to draw out the intelligence of the working miners and, further, to encourage among them the study of mining and kindred subjects. It encourages the more intelligent miners to compete for the prizes. In a recent notice we see that prizes are offered for "the three best essays on practical mining written by any miner working in or about the coal mines of the South Durham Inspection District."

We have, unfortunately, never made any organized attempt here to assist the practical working miner to learn more than he learns while at his regular work. He does not have much chance to learn the reasons of things except what he picks up from the technical newspapers of the day. And it is to his credit that he has learned a great deal from such sources. Journals like the MINING AND SCIENTIFIC PRESS, which circulate in mining communities, have furnished him with the experiences of others, and with the descriptions of machines, processes and methods, which have enabled him to become more progressive than if he worked away blindly day by day at his labor. None of our rich men who have made their money by mining have ever thought proper to offer prizes for essays on mining from practical men. If this had been done, a great deal of value would no doubt have been added to our literature on the subject.

These men who blast and pick, and timber, and do other work under ground have experiences which, if properly formulated and presented to the world, would be of the greatest utility in future work. They study Nature in their own way, but generally without the aid of scientific training, which is reserved for the few. Nevertheless, were it possible to obtain from them various experiences, the world would be the gainer. Every district has its peculiarities, learned only by the men who wield the miners' tools.

Lead.

California is not now much of a lead producer, but Nevada continues to produce large quantities. Utah is the heaviest producer, shipping large amounts East, and now working some of it up into sheet and pipe, and making white lead. A good deal of argentiferous galena has been mined in Castle Dome district, Arizona, and smelted at the Selby Lead Works, in this city. As this ore ran low in silver, its extraction may be said to have come the nearest to anything that has been done in the way of lead mining proper, the value of most of the plumbiferous ores treated here consisting of gold and silver. We have not worked any ores of this class exclusively for the lead they contained. For a long time 5,000 or 6,000 tons of lead were exported from this city to China, where it is used largely as lining for tea chests; but the Chinese now get most of their supplies from England.

For the past ten or twelve years the Selby Lead Co. have turned out an average of 6,000 tons of lead. About 3,000 tons of this they now manufacture into bars, shot, pipe, sheet lead, etc., in which shape it is consumed on this coast.

The Richmond Con. Co., at Eureka, Nev., has for a very long time been turning out about 4,500 tons a year. The Eureka Con. produces about the same amount, which is sent as crude bullion to the Selby Smelting Works here. During 1877 and 1878 the price of lead was low, and the production was checked on this coast. The industry is now fairly prosperous, and promises to expand under present conditions. The Wood River country, Idaho, produced about 4,000 tons of lead in 1881, and 5,000 in 1882. Most of that made in 1881 was from ore shipped to Salt Lake and Omaha. Last year one-third as much was produced by smelters in the county. It is thought these Wood River mines will produce 6,500 tons this year.

The California College of Mines.

The University of California is an institution wisely planned and richly equipped, and its faculty includes scholars most eminent in the country in their special lines of thought and investigation. The institution, too, is most delightfully and eligibly situated. Its fame is being widely spread, and its future expansion and growth will be commensurate with the progress of our better half of the country.

Our engraving shows the University buildings and grounds, the surrounding town of Berkeley, the beautiful bay of San Francisco, and beyond are the Golden Gate and the city of San Francisco. Seen from San Francisco, Berkeley seems a gray, ribbon-like strip, drawn close in between the water and the hills. More closely observed, it expands into a broad slope, or tilted plane, with a rise so gradual that, in crossing it, one attains a considerable elevation before he is aware that he has left the level of the ocean. Hence, it has hight without the effort of ascent, and those desirable accidents of light, pure air, and an ample prospect, which includes plain, valley, mountain, inlet, island, and nearly every other incidental feature of earth, water and atmosphere, considered essential to fine landscape. This natural panorama

University by D. O. Mills, Esq.; the Pioche collection, an extensive miscellaneous collection of minerals, rocks, ores, shells, etc., from all parts of the world, and especially from South America, presented to the University by the late F. L. A. Pioche; the Hanks collection, consisting of miscellaneous minerals and rocks, presented by James R. Keene, Esq., of San Francisco; selections from the Ward series of casts, purchased by the University; and current donations.

The Museum of Historical Geology is in process of formation. The Museum of Paleontology contains a full suite of the fossils of California, both animal and vegetable. Most of these have been already described and figured; the animals in the State Geological reports of Professor J. D. Whitney, and the plants, by M. Lesquereux, in the Memoirs of the Museum of Comparative Anatomy of Harvard. The paleontological material from the Voy collection has, however, never been worked up, and offers, consequently, to the student an excellent field for original work. There are also selections from the series of Ward casts.

The Museum of Petrography contains many foreign rocks, but is especially rich in California material, collected by the corps of the State Geological Survey and by Mr. C. D. Voy. The rocks are being arranged systematically and geographically, so that, as the collection be-

for investigation, facilities for which are freely placed at the disposal of the student. All of the foregoing museums are open at all times to the public, Mr. Rivers being in constant attendance to show visitors through the various collections.

Chemical, Assaying, and Metallurgical Laboratories.

The chemical laboratories are planned after the most careful study of the newest and best arranged laboratories of this country and of Europe, with the aid and advice of many experienced teachers of analytical chemistry. There are two principal laboratory rooms, one for qualitative analysis, the other for quantitative analysis, each having accommodations for thirty-two pupils. They contain a number of evaporating niches, sand and steam baths, drying ovens, filter apparatus, etc. There are rooms all well equipped for fusions, organic analysis, gas analysis, etc.; also a balance room, with balances from the best makers. Such apparatus as is needed for the study of analytical chemistry is loaned to the students, without charge. There is a good supply of apparatus for carrying on original investigation.

The metallurgical laboratories are large and well equipped. The assaying laboratory is designed to offer every facility for the assays of all kinds of ores, bullion, slags, mattes, etc. The crushing and sampling room contains large

tery, amalgamating pans, settlers, concentrating apparatus, roasting furnace and leaching apparatus, and will enable students who have finished the undergraduate course in metallurgy and assaying, to sample, assay and then treat by the methods in actual use, most of the gold and silver ores of California. In all such cases, the student will be required to determine amount and causes of losses, and the expense of treatment.

Mineralogical and Petrographical Laboratories.

The mineralogical laboratory is provided with a large collection of unlabeled minerals, which students determine by their physical properties. A separate course on blowpipe is offered by the chemical department. Special students on mineralogy will find every facility for investigations in optical mineralogy. The apparatus at disposal consists of a large reflection goniometer and spectrometer (reading direct to ten seconds), from Fuess, in Berlin; also, from the same maker, Groth's Universal Apparatus, consisting of a polarization instrument for both parallel and converging polarized light, an apparatus for determining the angle of optical axes, and a small goniometer and spectrometer; also, an apparatus for cutting and grinding crystal sections.

In the petrographical laboratory every facility is furnished for the study of rocks, both by the ordinary process of mineralogical investigation



VIEW OF BERKELEY, THE UNIVERSITY OF CALIFORNIA AND SAN FRANCISCO BAY.

of San Francisco bay and the adjacent hills is especially remarkable for a refined variety of outline and color, but the noblest effects are not wanting.

In preparing the view which we present, the artist stood upon one of the low hills in rear of the University grounds, and the reader looks with him down upon the campus, with its trees, shrubbery and openings, upon the rear side of the buildings, and thence westward upon the slope of the Berkeley plain and the bay beyond. Of the four large buildings shown, that upon the left is the College of Agriculture. The building semi-circular in form is the Bacon Art and Library building. Next to the right is the College of Letters. The last of the four buildings, partly hidden among the trees, is the College of Mining and Mechanical Arts, of brick, four stories high. It is devoted to the studies implied by its name, and is splendidly fitted out for its uses. Some description of this department will interest our mining readers.

The Collections of the University.

In the first place, to the mining student, great interest centers in the geological, mineralogical and paleontological collections of the University. The collections are made up from materials obtained mainly from the following sources: The State Geological collection, which has been placed at the disposal of the University; the Voy collection, consisting of a large number of California fossils, minerals, rocks, etc., collected by Mr. C. D. Voy, and presented to the

comes more complete, the geographical distribution of the rocks of the Pacific coast will be known with great accuracy and detail. It is designed to issue, as soon as possible, a descriptive catalogue of the rocks of California.

The Museum of Economic Geology, although so recently founded, is already large, and is in frequent receipt of valuable acquisitions from all parts of the Pacific coast. The importance and value of this collection can scarcely be overestimated. It will subserve two purposes—on the one hand it renders possible a course of instruction in ore deposits, which is of essential importance to those who intend to pursue the profession of mining engineer, and, on the other hand, the ore deposits of this coast will be collected together for the first time in one institution, where they can be subjected to careful and critical comparative investigation, to the end that the laws of their occurrence may, as far as possible, be determined. To this end an elaborate blank book has been devised, in which are carefully tabulated the name, locality, form, thickness, dip, strike, wall rocks, etc., of every ore deposit on the coast, as soon as accurate information upon these points can be obtained. The mass of statistics thus obtained will be made the basis of the above-mentioned investigations.

The Museum of Mineralogy is very large and fully arranged, and is supplied with ample case room. It fully illustrates the instruction in mineralogy, and offers inexhaustible material

iron mortars and rubbers (a panning sink), an assortment of sieves, and a large sampling table. Another room is devoted to the ore or pulp scales and the fluxes, and contains a hood with burners and stands for parting gold and silver. The furnace room contains four crucible furnaces and three muffle furnaces, arranged for burning coke, a large Freiberg muffle furnace, and one for crucibles arranged to burn soft coal. These furnaces have all been carefully designed and are built into the walls and ironclad in a substantial manner. A storeroom and a weighing room for the assay balances complete the lower floor. On the floor above, a large room, devoted to bullion and volumetric assays, contains a pair of muffle furnaces, parting hoods, a galvanic battery, work benches, tools and a pair of steel rolls. Another room, lighted by yellow-glass windows, is devoted to the humid or mint assays. A third room, for special investigations, contains a gas muffle furnace and one for crucible assays; also a water-blast blowpipe and a distillation apparatus. A special balance room is arranged on this floor for the finest assay balances. All the appliances are of the most improved pattern, and offer excellent opportunities for instruction and original research. The only charges are for the materials actually used by the students.

The appropriation lately made by the Legislature for this college will be at once applied to the construction of a metallurgical laboratory. It will contain a small rock breaker, stamp bat-

and by the preparation of thin rock sections and an examination under the microscope. The laboratory possesses six first class microscopes. The student has access at all times to the facilities provided for this work, and the material to be investigated is practically inexhaustible.

The Mining Course.

The Course in Mining is designed for students who wish to become mining or metallurgical engineers, or to engage in one of the many pursuits connected with the mining industries, such as the surveying and mapping of mines, the assaying and working of ores, the designing and use of mining machinery, or the exploitation of mines. In order that people in the mining regions may know what may be learned in the course, the following is presented:

The undergraduate course includes a thorough preparation in the modern physical sciences, training in English, and the acquisition of a reading power of German (or French). It may be completed by the average student in four years. Instruction is given according to the nature of the subject, either by lectures and recitations, or by practical exercises. The lectures are fully illustrated. The practical exercises consist of laboratory and field work, in which each student does the work himself under proper guidance. The following is an outline of the course in addition to English and German (or French):

(CONTINUED ON PAGE 430.)

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as new. It will be sold very much below cost, and
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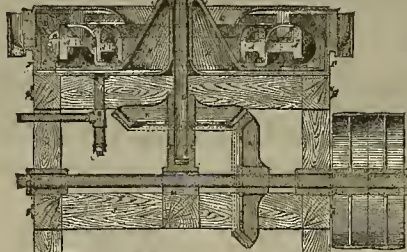
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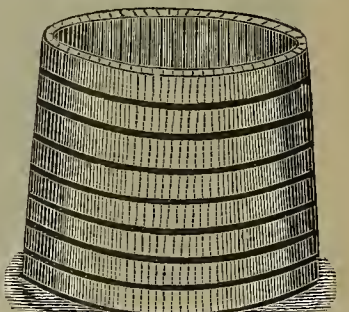
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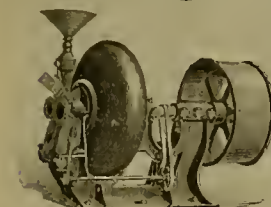
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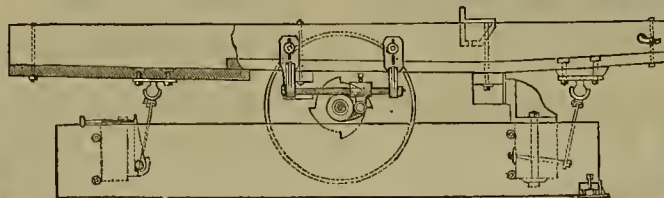
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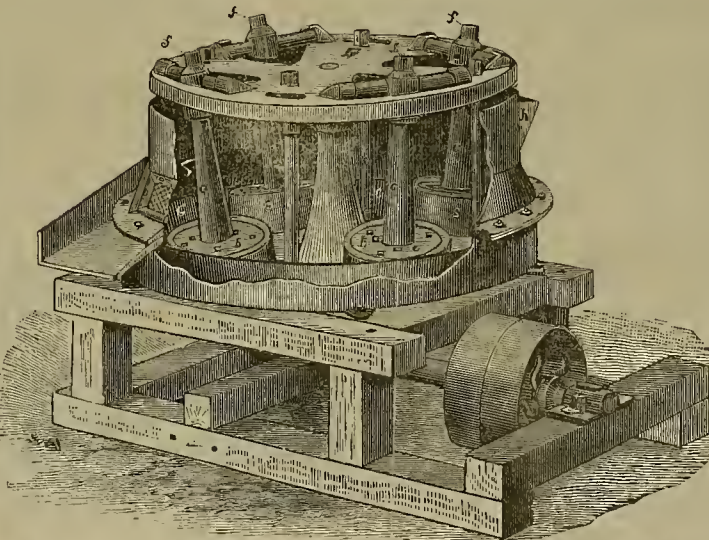


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List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING JUNE 12, 1883.

- 279,122. GOLD WASHER. Belis & Wilson, Salt Lake, Utah.
279,325. STREET CAR PROPULSION. R. F. Bridewell, S. F.
279,225. AUTOMATIC RAILWAY ALARM.—Frank Clifford, Carson City, Nev.
279,236. SUSPENSION HOOK.—Sam'l J. Fletcher, S. F.
279,148. BUCKLE.—D. G. Dray, Pleasant Hill, Oregon.
279,242. MAGAZINE FIREARM.—H. T. Hazard, Los Angeles, Cal.
279,249. GIRDER AND BEAM.—Peter H. Jackson, S. F.
279,266. VEHICLE SEAT.—Jos. Newman, Sacramento, Cal.
279,273. TELEMETRY.—Win. D. Patterson, S. F.
279,428. TWO-WHEELED VEHICLE.—N. Peterson, Antioch, Cal.
279,277. ORCHARD CULTIVATOR.—G. Richardson and G. Enderson, San Jose, Cal.
279,438. SADDLE HORN.—O. Ruparts, Albany, Oregon.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

AUTOMATIC RAILWAY ALARM.—Frank Clifford, Carson City, Nev. No. 279,225. Dated June 12, 1883. This invention relates to a novel automatic railway alarm to be used at crossings; and it consists in a mechanism attached to the locomotive, preferably between the cylinder and the first driver, consisting of a revolving hub, provided with peculiar forked arms, which, by coming in contact with posts placed suitably upon the side of the track, are turned to revolve a disk, furnished with an eccentric groove, in which a stud upon the end of a piston, connected through intermediate devices with the steam-whistle travels. There is a peculiar hand connection to operate the whistle. The object of this invention is to prevent accidents at points where roads cross the railway track and this is done by sounding an alarm, which, by reason of the operating mechanism, is not dependent upon vigilance of the engineer, but is automatic in its operation.

TWO-WHEELED VEHICLE.—Nelson Peterson, Antioch. No. 279,428. Dated June 12, 1883. This invention relates to the class of two-wheeled vehicles known as "carts," and to certain improvements therein. The invention consists in a hinge connection in the main body supporting springs and the axle, and in combination therewith of suitable connections between the ends of the springs and the shafts of their cross-bars. The object of the invention is to overcome as much as possible the joggling motion of the horse, which is usually communicated to the seat, and the object is attained by such a construction as to break the rigid connection between the shafts and axle and the remaining parts of the vehicle.

SUSPENSION HOOK.—Samuel J. Fletcher, San Francisco. No. 279,236. Dated June 12, 1883. This invention relates to a new and useful suspension hook for sustaining curtains, drapery, etc., and it consists in a double plate, having a swivel hook in its top, and in a screw-eye passing through said plate and receiving a nut. A particular adaptation of this hook is to suspend from it at the same time the heavier curtains or drapery and also the lace curtains to the best advantage. The usual way in which curtains are suspended is by a cornice, or a horizontal pole upon which are fitted a number of rings. These rings have eyes or staples in them, and some kind of hooks or pins are secured to the curtain and engage with the screw-eyes to suspend them. All these hooks have in some way to be sewed to or pinned into the material, and they cannot be made ornamental, nor can they be applied with much readiness. The lace curtains are secured to a rod behind the pole, and are drawn up so tight that they are seen from the inside above the droop of the heavier curtains. It is the object of this invention to provide a hook adapted to be readily applied, capable of ornamentation, and which will suspend from itself both the heavier curtains and the lace curtains.

TELEMETRY.—Win. D. Patterson, S. F. No. 279,273. Dated June 12, 1883. This invention relates to a new and useful telemetry, and consists in a tube having a means at one end for observing the direct and reflected rays of light from the object, and a means at the other end for causing the reflected ray to coincide with the direct ray, and for reading the angle of the reflected ray, whereby said angle, the base and the right angle of the direct ray with the line of collimation in the tube being known, the size of the angle of the reflected ray may be readily computed and the distance of the object

ascertained. The object of this invention is to ascertain the linear distance to any given object, and to provide for this purpose a simple and effective instrument.

ORCHARD CULTIVATOR.—Gains Richardson and Geo. Enderson, San Jose. No. 279,277. Dated June 12, 1883. This invention relates to a new and useful cultivator, especially designed for use around trees in orchards, etc. The invention consists in a frame, the teeth of which on one side of the center are set in an opposite direction to those upon the other side. The center of the frame is provided with a bearing for embracing the trunk of the tree, and a means for rendering it adjustable to fit different sizes of trees.

VEHICLE SEAT.—Jos. Newman, Sacramento. No. 279,266. Dated June 12th, 1883. This invention relates to a new and useful improvement in vehicle seats, and it consists in a cushion socket or recess, in connection with the shell, and in the construction, whereby this socket is formed. The seats of vehicles are usually constructed with a bottom portion to sustain the cushion and flaring portion, called technically the "shell," to confine the cushion, and to form a slight back or rest for the occupant. This shell is built right out from the bottom, and is generally not more than six inches high. The cushion is then laid on the seat. In certain classes of vehicles, notably in those known as "side cars," the springs are made rather light for sake of the appearance, and therefore they do not ride as easily as others. In order to compensate for this, cushions have been used which have been somewhat of an improvement, and this demonstrates that greater improvement can be made in this direction, if it were possible to use cushions having deeper springs. In the present construction of the seat this is not possible, and the cushion, being thicker, would throw the rider uncomfortably high; or by lowering or dropping the bottom of the seat, forming a socket, or recess, below the shell, a thick cushion having deep springs may be used, and the result attained. This is the object of this invention, namely, to be enabled to use a cushion having deep springs without throwing the rider too high.

News in Brief.

A HALIBUT, weighing 202 pounds, has been caught in Puget sound, near Whatcom, W. T.

THERE is more than \$2,000,000 worth of opium in the Appraiser's store in San Francisco.

The Suez company has agreed with the English Government as to the terms of making the second canal.

So crowded are the hotels at Seattle, W. T., that many people are unable to find sleeping accommodations.

The Salvation Army now, it is stated, numbers 484 corps, with 1,500,000 members, whilst the income amounts to £121,000.

THE exports of wheat from the port of New York from June 1st to June 20th will be about 145,000,000 bushels, against 132,000,000 last year.

DE LESSER estimates that the cutting to flood the North African desert can be completed in five years, at a cost of not more than \$30,000,000.

LOVE is much elated at the result of the trial of J. W. Saunders, one of the leaders in the riot when a saloon was destroyed in that town some months ago.

THERE were about seven hundred and fifty wheelmen in line at the third annual meet of American wheelmen, held in New York, May 28th, and the procession was one mile in length.

It is stated that at Red Rock canyon, on the regular road from Mojave to Independence, the carcasses of 2,000 sheep are lying, polluting the atmosphere for miles about. It is surmised that they were poisoned by the bad water of that place.

Etna Iron Works.

Attention is called to the advertisement of the firm of Starr, Malter & Co., of Nos. 217, 219 and 221 Fremont street, San Francisco, who have thoroughly reorganized the business formerly conducted by Messrs. Pendegast, Smith & Co., well known as the Etna Iron Works. The affairs of the old firm were satisfactorily adjusted in the interest of former creditors, whose accounts were liquidated almost entirely in full, the honor of which action being due to Messrs. Malter & Starr, who came promptly forward, voluntarily meeting the creditors in an honorable, upright manner, thereby saving the reputation of the old concern, and also adding to their own. As heretofore the business will be manufacturing general iron work, marine, steam and hydraulic engines, but they will make a specialty of mining machinery. New improvements in machinery and apparatus of all modern kinds have been added in the various departments, making these works very complete in all detail. A new office of general superintendent has been created, and good choice was demonstrated in selecting the former superintendent, Mr. Geo. Birrell, to fill the place. He is a young man thoroughly practical in every department of manufacturing, having learned and graduated in the business in this city. He is eminently fitted to bold so important a trust, and under his supervision the Etna Iron Works should not fail of success.

The California College of Mines.

(CONTINUED FROM PAGE 425.)

Mathematics.—Algebra, geometry, trigonometry, analytical and descriptive geometry, differential and integral calculus.

Physics.—A course of lectures on experimental physics: heat, light, sound and electricity, followed by practice in the physical laboratory.

Chemistry.—Experimental lectures and recitations on inorganic chemistry, particular attention being paid to the chemistry of the metals as a basis for subsequent work in metallurgy. Also, extensive laboratory practice in the qualitative and quantitative analysis of minerals, ores, rocks, and metallurgical products. The use of the blowpipe is taught in connection with this work. Quantitative analysis is elective with surveying, but is required of those who intend to become candidates for the degree of Metallurgical Engineer.

Mineralogy.—Lectures on crystallography and the physical properties and uses of the most important ore, gangue and rock-forming minerals. The course is illustrated by numerous models and a collection of over 10,000 minerals. Considerable time is devoted to practice in the determination of minerals by the use of the knife, lens and streak-plate. The working collection for this purpose alone contains over 2,000 specimens.

Geology.—A course of lectures on dynamical, structural and historical geology. The course is illustrated by numerous drawings, casts and models of fossils.

Mechanics.—Lectures on analytic mechanics; strength of material with applications to framing, timbering and machine construction; hydraulics, pressure of water in dams and reservoirs, flow of water in pipes and ditches, hydraulic motors. The course is illustrated by numerous problems and applications.

Mechanical Drawing and Construction.—These are made, as far as possible, an application of the course in mechanics to mining and metallurgical engineering. Instruction is given in designing machinery and fixed structures for mining and metallurgical work.

Surveying.—This course includes: Land and topographical surveying and leveling; the laying out of roads, tramways, ditches, pipe lines, mining claims; underground work; extensive practice in the field with compass, transit, level and plane table, and the plotting of field notes and construction of maps and sections. The instruments and grounds of the University furnish excellent facilities for this work. The course in surveying is elective with quantitative analysis, but is required for those who intend to become candidates for the degree of Mining Engineer.

Mining.—Nature and mode of occurrence of ores; prospecting and exploring ore deposits; United States laws governing location of claims; open cut and quarry work; hand and machine drilling; explosives; blasting; tunneling, with methods of excavation and timbering; shaft sinking, timbering and walling; stoping; tramming; hoisting; pumping and drainage; lighting; hydraulic mining; general organization and administration. The course is illustrated by drawings, sketches, data, and references to typical mines in operation on the coast.

Metallurgy.—(General part): Classification of ores and processes; crushing and sampling ores; fuels; fluxes; refractory materials; furnaces; accessory machinery; metallurgical products. (Special part): The metals selected are the ones at present most important on this coast—gold, silver, lead and quicksilver. Both wet and dry methods of reduction are taken up and discussed in detail. The illustrations and data are drawn, as far as possible, from actual work on the coast.

Assaying.—The fire assays accompany each metal in the course of metallurgy, and the instruction is made, as far as possible, to illustrate the methods of reduction used on the large scale. Particular attention is paid to the fire assays of ores of gold, silver, lead and quicksilver. The assays of fuels and the remaining useful metals are elective with advanced work in construction.

Thesis.—The undergraduate course concludes with the preparation of an original thesis on some subject connected with mining or metallurgy.

Excursions.—Students are urged to use their holidays and shorter vacations throughout the course to visit and study the many large machine shops, foundries, rolling mills, powder, smelting and other technical works in the vicinity of Berkeley, Oakland and San Francisco. They are also urged to use their summer vacation of two months, and their winter vacation of three weeks, to visit and study various typical mines and reduction works at a greater distance. Students who earnestly and systematically pursue the above plan not only do better and more intelligent work at college, but make acquaintances and acquire a fund of information that is afterwards of great practical use to them.

Postgraduate Courses.

Students desiring any time to pursue advanced or special work after graduation, will find every facility extended to them which the libraries, laboratories and collections of the University offer.

Candidates for professional degrees in this college must satisfy the following conditions:

A candidate for the degree of Mining Engineer must be a graduate of the College of Min-

ing of the University, or he must give evidence satisfactory to the Faculty of having successfully pursued a course of study, equivalent to that given in the College of Mining in the University.

In addition to this he must pass a satisfactory examination in the following subjects: mining, ore dressing, petrography, economic geology, thermodynamics (elements), drawing and construction of mining machinery, blowpipe assaying, and political economy. He must have had at least one year of actual practice in the field, in the course chosen, and must show by an original memoir upon some subject bearing upon this profession, his power to apply his knowledge to practice. This degree will not be given earlier than three years after graduation.

A candidate for the degree of Metallurgical Engineer must pass an examination in the following subjects: Metallurgy, ore dressing, assaying and analysis, blowpipe assaying, thermodynamics (elements), drawing and construction of furnaces and metallurgical machinery and political economy. In all other respects the requirements are similar to those stated for the degree of Mining Engineer.

Special and Partial Course Students.—Students who may not be able to take the full undergraduate course may attend such classes in mining, metallurgy or assaying as they may be prepared to enter.

Petrography and Economic Geology.

In the chemical course the instruction is petrography, covers the following ground: (1) The different methods of rock investigation, viz., physical and chemical; (2) rock texture and rock structure; (3) the different forms in which rock masses occur; (4) classification and nomenclature of the leading systems proposed; (5) descriptive petrography, special attention being given to the rocks of California; (6) petrogenesis, or the origin of rocks; (7) changes and decompositions which rocks undergo. The laboratory is well equipped, and the student has every opportunity for practice in the determination of minerals by the microscope and ordinary mineralogical methods. A large field for original research is open to the student in the museum of petrography. The course is open to all students who have completed the University course in mineralogy, or an equivalent course elsewhere.

The course of instruction in economic geology consists (1) of a consideration of the geological nature of ore deposits; (2) a special description of the ore deposits of this country, with references to the most instructive examples of foreign ore deposits. The course is illustrated by geological maps and charts, and sets of specimens of ores and wall rocks from the principal ore deposits on this coast.

PACIFIC MILL COMPANY.—Following is the list of officers of the Pacific Mill and Mining Co.: Trustees—W. S. Lyle, J. W. Mackay, George Congdon, C. O'Connor and George Frier. President, J. W. Mackay; Vice-President, George Congdon; Superintendent, D. B. Lyman; Secretary, W. H. Lowell.

A TRUE strengthening medicine and health renewer is Brown's Iron Bitters.

CAPTAIN WEBB, champion swimmer, will undertake to swim through the Niagara whirlpool on the 21st of July. The \$10,000 subscribed is raised by railway companies, who are using it as a grand advertisement, and will run special excursion trains.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times,) by turning a leaf.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

- G. W. McGREW—Santa Clara county.
M. P. OWEN—Santa Cruz county.
J. W. A. WRIGHT—Merced, Tulare and Kern counties.
JARED C. HOAG—California.
B. W. CROWELL—Arizona Territory.
N. H. HARGOOD—Plumas county.
M. H. JOHNS—Eureka, Nev.
I. M. LEHMAN—Los Angeles, San Bernardino and San Diego counties.
A. C. KNOX—Oregon and Washington Ter.
F. W. STRATTON—Sierra and Yuba counties.
J. J. BARTLELL—Yolo county.
JAMES W. BOYER—Sacramento county.

DON'T FORGET THE STAMP.—Always take a last look at a letter before posting to see that the stamp is in place. Recently one of our agents in Los Angeles county found a letter containing \$3 for one year's subscription to our paper, held for postage which the writer no doubt thought he had duly stamped, and but for the incidental finding of it by our agent, would of course have supposed we had received the money at the proper time. Let all subscribers when remitting or ordering their paper stopped be sure they duly stamp their letters.

CORRESPONDENCE is cordially solicited from reliable sources upon all topics of interest and value to our readers.

ADDRESS all correspondence to the name of the paper, or firm, as either of the publishers or editors connected with the office are quite likely to be absent at times.

Recent Contributions to the California
State Mining Bureau.[Furnished for publication in the MINING AND SCIENTIFIC
PRESS by HENRY G. HANKS, State Mineralogist.]

[CATALOGUE.]

4993. Copper Silver Ore-Sweet Vengeance mine, Santa Fe mining district, Esmeralda county, Nev. J. H. Crossman.
4994. Copper Ore, Red Oxide Sweet Vengeance mine, Santa Fe district, Esmeralda county, Nev. J. H. Crossman.
4995. Copper Ore Johnson mine, near Luning, Esmeralda county, Nev. J. H. Crossman.
4996. Wall Rock-Sweet Vengeance mine, Santa Fe district, Esmeralda county, Nev. (See No. 4993) J. H. Crossman.
4997. Wall Rock Sweet Vengeance mine, Santa Fe district, Esmeralda county, Nev. (See No. 4993) J. H. Crossman.
4998. Travertine Major's creek, Santa Cruz county, Cal. Mrs. J. G. Tanner.
4999. Alum (see No. 2739) Teel's marsh, Esmeralda county, Nev. South Brothers.
5000. Copper Ore Italy mine, near Luning, Esmeralda county, Nev. J. H. Crossman.
5001. Copper Ore Sonora mine, near Luning, Esmeralda county, Nev. J. H. Crossman.
5002. Copper Ore Copper King mine, near Luning, Esmeralda county, Nev. J. H. Crossman.
5003. Wall Rock (Hanging Wall), Lime Stone Copper King mine, near Luning, Esmeralda county, Nev. J. H. Crossman.
5004. Wall Rock (Foot wall), Talouse Slate (B) Copper King mine, near Luning, Esmeralda county, Nev. J. H. Crossman.
5005. Fossil Bone of Mammoth (Femur) Near Goldwin bay, north of Norton sound, Alaska. J. C. Green.
5006. Skull of an Elephant Near Goldwin bay, north of Norton sound, Alaska. J. C. Green.
5007. Tooth of Elephas Primigenius Near Goldwin bay, north of Norton sound, Alaska. J. C. Green.
5008. Calotte (Compact Botryoidal), found with Pricette (Chert), Curry county, Oregon. John Crosswell.
5009. Calotte (Botryoidal) on Copper Ore-Raymond and Ely mine, Mrs. H. H. Day.
5010. Dolomite Raymond and Ely mine, Eureka county, Nev.; 700-foot level. Mrs. H. H. Day.
5011. Dolomite (Botryoidal) on Copper Ore-Raymond and Ely mine, Mrs. H. H. Day.
5012. Large Specimen containing Fossil Oysters Posa creek, foothills of Sierra Nevada, Kern county, Cal. K. Donnelly, M. D.

LOTS OF WORK FOR THE CARSON MINT.—An attache of the branch mint at Carson informs the Reno Gazette that the authorities at Washington do not buy any bullion for it, but let it stand on its own bottom. They fix the price it can pay for silver and allow any one party the privilege of depositing as high as 10,000 ounces a day. If people bring sufficient metal there to keep it running, well and good; if not it shuts down. Just now quite a lot of bullion is being put in every day, and it is piling up much faster than it can be coined. There is several months' supply on hand now, and there is no reason why the inflow should cease so long as Southern Nevada and the Comstock yield anything.

AN EXPERIMENT.—Thirty tons of sulphurets from the Murebie mine have been shipped to Omaha to be worked by a new process, which, it is claimed, returns a larger per cent of the precious metal than any of the processes in use on this coast. It is an experiment on the part of the Murebie mining company, and the result will be awaited with interest by the other mining companies hereabouts. The sulphurets are valued at \$250 per ton.—*Nevada City Herald.*

ELECTRICAL BALLOON.—Tissandier, the French balloonist, proposes to build a balloon to be driven by an electro-dynamic machine fed by accumulators. The balloon is to be elliptic in shape, and about 40 meters long. It is calculated to have a total lifting power of 7,000 lbs., or, after deducting the weight of the accumulators, a capacity of raising fully 2,000 lbs. of freight and passengers.

If you are sick and troubled with dyspepsia, Brown's Iron Bitters will cure you.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct, or if the paper should ever come beyond the time desired, be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time, we cannot be responsible for the errors or omission of agents.

ORE PULVERIZER.—The rotary ore pulverizer, advertised in another column as for sale by Mr. Heald, has been used but very slightly, and is a bargain to any one in want of such a machine. It is only sold because the company which ordered it is dissolved, and there is no possible use for it. All the necessary gearing, frame, etc., go with the pulverizer, which can be set running in half an hour after it is received. Parties needing something which will grind ore fine, will do well to communicate with Mr. Heald concerning this machine.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased, and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete, and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

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A Monthly Magazine.

Devoted to the best interest of the Pacific Coast. This magazine is the exponent of a vigorous literature and has what is so hard to create, A DISTINCTIVE FLAVOR.

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Attorney and Counsellor-at-Law,
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(Over Wells Fargo & Co.'s Bank.)

Special Attention Paid to Patent Law.
N. B.—Mr. J. L. Boone has been connected with the Patent business for over 15 years, and devotes himself almost exclusively to Patent litigation and kindred branches.

No Whiskey!

BROWN'S IRON BITTERS is one of the very few tonic medicines that are not composed mostly of alcohol or whiskey, thus becoming a fruitful source of intemperance by promoting a desire for rum.

BROWN'S IRON BITTERS is guaranteed to be a non-intoxicating stimulant, and it will, in nearly every case, take the place of all liquor, and at the same time absolutely kill the desire for whiskey and other intoxicating beverages.

Rev. G. W. RICE, editor of the *American Christian Review*, says of Brown's Iron Bitters:

Cin., O., Nov. 16, 1881.

Gents:—The foolish wasting of vital force in business, pleasure, and vicious indulgence of our people, makes your preparation a necessity; and if applied, will save hundreds who resort to saloons for temporary recuperation.

BROWN'S IRON BITTERS has been thoroughly tested for dyspepsia, indigestion, biliousness, weakness, debility, overwork, rheumatism, neuralgia, consumption, liver complaints, kidney troubles, &c., and it never fails to render speedy and permanent relief.



Is the Best Pump in the World. Another New Improvement is Lewis' Patent Spray Attachment.

Can change from solid stream to spray instantly. Regular retail price, \$6. Weight, 4 lbs. Length, 32 inches.

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Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

Seaton Gold Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Drytown, Alameda county, California.

NORTH E. There are delinquent upon the following described stock, on account of Assessment No. 2, levied April 10, 1883, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Scott, E. A.	4	10	\$ 75
Warner, Alex.	5	10	75
Martin, A. Trustee	6	5,000	375 00
Martin, A. Trustee	7	5,000	375 00
Martin, A. Trustee	8	5,000	375 00
Martin, A. Trustee	9	5,000	375 00
Martin, A. Trustee	10	1,000	75 00
Martin, A. Trustee	11	1,000	75 00
Martin, A. Trustee	12	1,000	75 00
Martin, A. Trustee	13	1,000	75 00
Martin, A. Trustee	14	1,000	75 00
Martin, A. Trustee	15	1,000	75 00
Martin, A. Trustee	16	1,000	75 00
Martin, A. Trustee	17	1,000	75 00
Martin, A. Trustee	18	1,000	75 00
Martin, A. Trustee	19	1,000	75 00
Martin, A. Trustee	20	500	37 50
Martin, A. Trustee	21	500	37 50
Martin, A. Trustee	22	500	37 50
Martin, A. Trustee	23	500	37 50
Martin, A. Trustee	24	500	37 50
Martin, A. Trustee	25	500	37 50
Martin, A. Trustee	26	500	37 50
Martin, A. Trustee	27	500	37 50
Martin, A. Trustee	28	500	37 50
Martin, A. Trustee	29	500	37 50
Martin, A. Trustee	30	1,000	300 00
Martin, A. Trustee	31	500	67 50
Davis, John A.	32	50	6 75
Martin, A. Trustee	33	5,000	375 00
Martin, A. Trustee	34	5,000	375 00
Martin, A. Trustee	35	5,000	375 00
Martin, A. Trustee	36	5,000	375 00
Kellogg, C. W.	37	100	7 50
Martin, A. Trustee	38	5,000	375 00
Martin, A. Trustee	39	5,000	375 00
Martin, A. Trustee	40	5,000	375 00
Martin, A. Trustee	41	5,000	375 00
Martin, A. Trustee	42	5,000	375 00
Martin, A. Trustee	43	10,000	750 00
Fischer, Bertha C.	44	100	7 50
Cornwall, P. B.	45	4,800	360 75

And in accordance with law, and an order of the Board of Directors, made on the 10th day of April, 1883, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at 528 California St., Room 6, San Francisco, Cal., on TUESDAY, the 5th day of June, 1883, at the hour of 1 o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expense of sale.

A. MARTIN, Secretary.

OFFICE—Room 6, 528 California St., San Francisco California.

POSTPONEMENT.

The above sale of delinquent stock is hereby postponed to THURSDAY, the 28th day of June, 1883, at 1 o'clock p. m., at the same place. By order of the Board of Directors.

A. MARTIN, Secretary.

San Francisco, June 6, 1883.

DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company

San Francisco, June 20, 1883.

At a meeting of the Board of Directors of the above named company, held this day, Dividend No. 18, of five cents (5c.) per share, was declared, payable on Thursday, July 12, 1883. Transfer books closed on Monday, July 2, 1883, at 3 o'clock p. m. This dividend is payable at the Farmers' Loan and Trust Company in New York, on all stock issued there, and at the office in this city on all stock issued here.

WM. WILLIS, Secretary.

OFFICE—Room 29, Nevada Block, No. 300 Montgomery Street, San Francisco, Cal.

ASSESSMENT NOTICE.

Gould and Curry Silver Mining Company.

ASSESSMENT No. 15.

Levied.....June 15, 1883
Delinquent.....July 20, 1883
Day of Sale.....August 13, 1883
Amount.....Fifty cents per share.

ALFRED R. DUBROW, Secretary.
OFFICE—Room No. 69, Nevada Block, No. 300 Montgomery Street, San Francisco, Cal.

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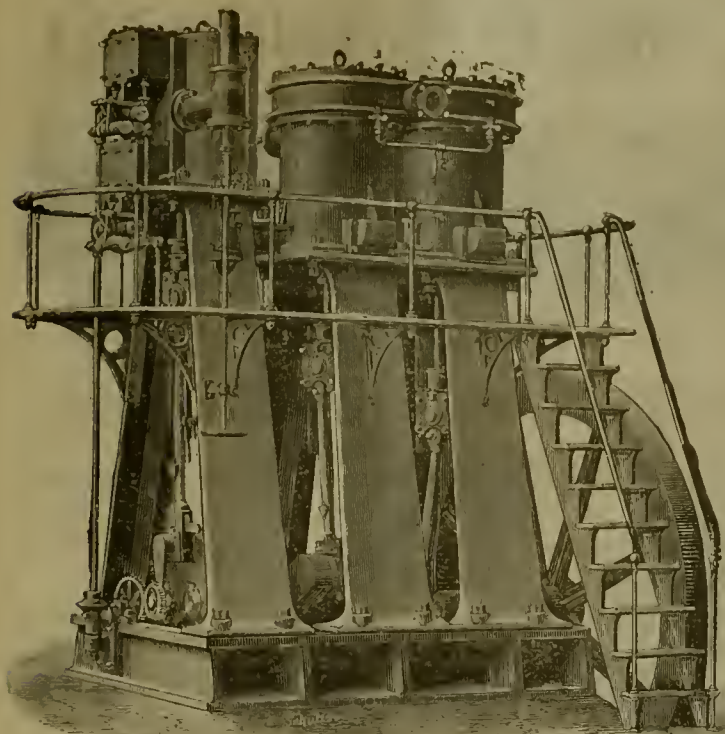
W. T. Y. SCHENCK,

36 California Street, : : San Francisco Cal.

The Lemmon Herbarium.

This Herbarium has been removed from the Blake House to a permanent place at 1205 Franklin St., near Fourteenth St., Oakland, one square east of the Post Office, where plants of the Pacific Coast, including Arizona, may be determined on application, and instruction given in botany during the winter. Sets or single specimens of the rare and new forms of the Pacific Coast for sale.

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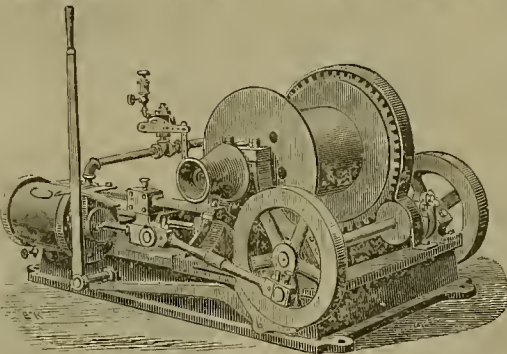
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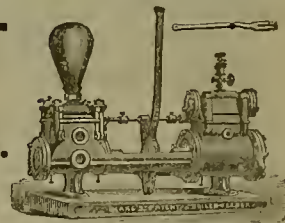
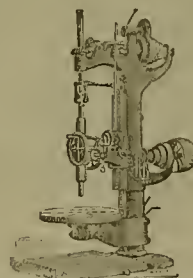
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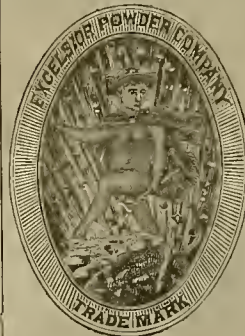
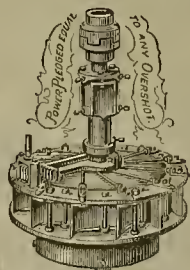
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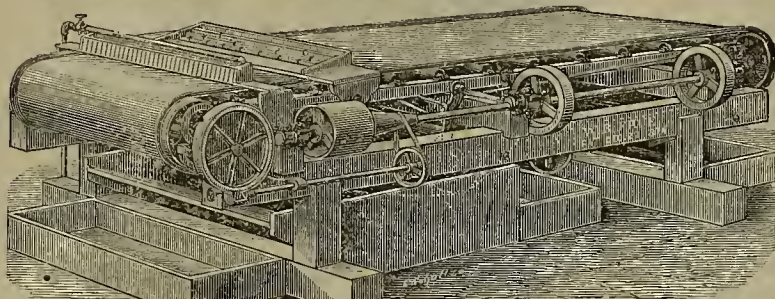
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To those intending to manufacture or purchase the so-called "Triumph" Concentrator, we herewith state:

That legal advice has been given that all shaking motion applied to an endless traveling belt used for concentration of ores is an infringement on patents held and owned by the Frue Vanning Machine Company.

That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

That the patent laws make users of infringements responsible as well as makers, and the public is therefore warned that there is considerable risk in purchasing any end-shake machine until our various patents have been decided.

That if there are those who for any reason prefer an end-shake machine, we can manufacture and sell to such a machine of that description, as efficient as the Triumph, and at a lower price, and no liability for infringement will then be incurred by the purchaser.

That we shall protect ourselves against any one making, selling or using any machine infringing any of our patents. Patented July 9, 1867; May 4, 1869; Dec. 22, 1874; Sept. 2, 1879; April 27, 1880. Patents applied for.

That we are, and have been, ready at any time, to make a competitive trial against the Triumph, or any other machine, for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Company,
Room 7, 109 California Street, - - - SAN FRANCISCO, CAL.
Nov. 6, 1882

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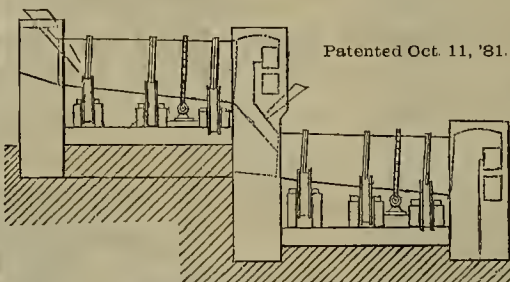
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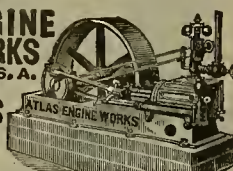


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The most delightfully situated colony in Southern California.

Remarkably healthy, being 2,000 feet above the sea level.

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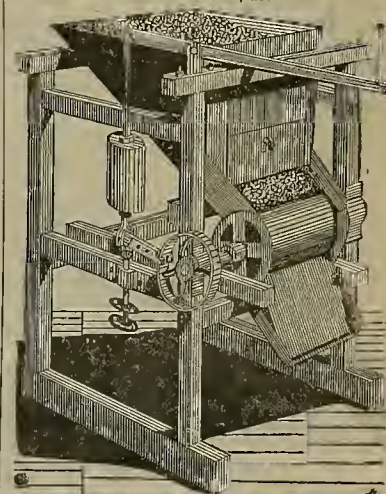
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Golden State and Miners' Iron Works,
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News-

ALASKA EDITION--TWENTY-FOUR PAGES.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JUNE 30, 1883.

VOLUME XLVI
Number 26.

Galvanic Treatment of Copper and Silver Ores.

Experiments are being made in Japan with a view to the introduction of the use of the galvanic process of treating silver ores. The solution of chloride of silver in salt (chloride of sodium), obtained by the Augustin process, has been treated thus. A great difficulty experienced has been to find a proper material for the electrodes. Platinum is excellent, but costs too much, with a bath 100 centimetres deep, and with a sectional area of 100 centimetres of the copper conductors, the requisite amount of platinum being at least 70 kilogrammes. Gold, silver, quicksilver and all base metals being dissolved by the chlorine, set free by the decomposition of the chloride of silver, cannot be used. Advantage has been taken of this dissolving power of the chlorine, set free after many trials, in the following way, but only on a small scale thus far.

Two Becker glasses, A and B, are partly filled with a salt solution of chloride of silver, and connected by the tube, C, whose ends are bound with linen cloth to prevent the entrance of any solid substances. Two electrodes of platinum wire are introduced into the glasses as shown in the figure, the cathode in A and the anode in B.

The decomposition of the dissolved chloride commences and the chlorine set free attacks the copper (for instance) pyrites. There are formed HCl Cu Cl_2 Fe Cl_3 , and also Cu SO_4 and Fe SO_4 , these last sulphates being changed by the chloride of sodium, so long as this is present, to Cu Cl_2 Fe Cl_3 and sulphate of soda (Na_2 SO_4). The necessary supply of chloride of sodium (which is constantly being decomposed) is effected by allowing fresh salt solution to drop constantly from a vessel D. Thus there is maintained a flow of the solution through C to A, when the excess, holding principally sulphate of soda, is drawn off by a syphon as shown.

The chlorides which go into solution are being constantly decomposed—copper, iron, silver, etc., are precipitated on the bottom of A, in slightly coherent masses, while the chloride attacks anew fresh bodies of ore. The process continues without interruption until all the ore is decomposed and all the metal precipitated.

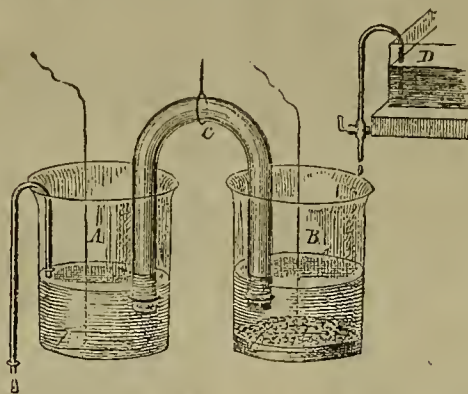
The process has been used successfully only in the laboratory, but trials are being made with a view to its introduction on a large scale. Where power is cheap it promises to be valuable, especially for ore rich in lime, which has been very difficult to treat successfully by other methods.—*B. u. H. Zeitung.*

Mining Expedition to Alaska.

An expedition left here last week in a schooner with a party of miners who are going to work certain mines in Alaska for parties in Oakland. They go well equipped in every respect, though starting rather late. Col. A. F. Williams, of Oakland, was in Alaska some ten years since and located an argentiferous galena mine near Golovin bay, Norton sound. We had a conversation last week with Col. Williams, and also the captain of the expedition. They expressed themselves confident of developing a fine property. The ore is almost pure galena, and runs up over \$150 per ton in silver.

The country all about the region visited by Col. Williams and party is a very difficult one

to prospect in, but this is not on account of the heavy timber, as most people suppose. This heavy timber is more prevalent in the southern part of the Territory. But there is a heavy coat of moss covering the whole face of the country, making it very hard to get about. In fact, it is a most villainous country to get about in. The moss is from one to two feet thick, and the ground is more or less boggy, so that if one

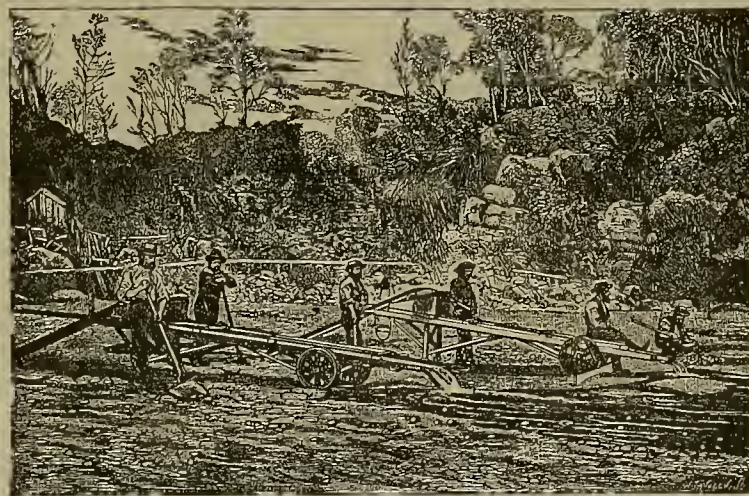


BECKER GLASSES FOR TREATING SILVER AND COPPER ORES.

steps off the moss bed, he is apt to get into the bog. Ten or twelve miles is a good day's travel, so it is very hard to prospect.

There are belts of timber here and there, but the mountains are generally barren and free from brush and trees. Yet there is timber here and there, and plenty for fuel or mining purposes.

The country rock is mainly a micaceous slate;



WORKING BEACH DIGGINGS IN NEW ZEALAND.

but no gold was found. The mountains seem to be of a white spar, which some suppose to be lime. There are great dikes of granite extending for miles and miles. No sulphurets of iron were found anywhere. There is plenty of mica in great scales and sheets.

At a meeting of British shipowners in London, on June 28th, opinions were received from eminent English counsel which were decidedly against the monopoly of Count de Lesseps of the work of construction of the new canal across the Isthmus of Suez. A committee of shipowners will forthwith demand power to construct the canal.

The Outlook.

Mr. Evarts, in his Centennial oration in Philadelphia, made this remark: "All the modifications of European politics accept the popular principles of our system and extend to our model. The movement towards equality of representation, with the enlargement of suffrage and public education in England, the

that it was inevitable, and the sooner kings and potentates made up their mind to meet it the better for them. Everywhere are indications that the empire of one ruler is over, that the reign of the million has begun. The person of every monarch is hedged about with bayonets. The bomb that burst under the coach of the Czar of Russia in the streets of Petersburg shook every throne in Europe. Everybody has heard of Bortholdi's statue of "Liberty Enlightening the World," now nearly completed by the French sculptor. It is to be presented by the Republic of France to the Republic of America, and placed in the harbor of New York. It is 150 feet in length, and will stand on a pedestal of equal height. One arm of the magnificent figure supports an uplifted torch which will be a brilliant electric light at an elevation of more than 300 feet above tide water. This splendid object of art embodies a grand idea. It will stand at the foot of our great commercial metropolis as the symbol of a political movement that began on this Continent, but is destined to flash its light over the whole world. It is also a symbol of political progress. We are in a world movement that has not yet produced its best men or form of government. The evolving forces never go backwards; and in the struggle of life the best wins. It is a movement that is slowly working the barbarism out of our politics, bigotry out of our religion. Science is hopeful. Religion is hopeful. Government is hopeful. The energies of unspeakable possibilities lie before us, and

"The higher mounted mind still sees the morning spread
The Silent Summit overhead.

Beach Mining.

At several places on the California and Oregon coast beach mining for gold is carried on. In New Zealand a considerable amount of gold is procured from the beaches. Near Charleston is a settlement of Shetlanders whose time is divided between small farm cultivation and the working of fine gold from the sea sand, which, after heavy weather, is easily got at, and found to be highly auriferous. These beach claims are deemed quite valuable. The working results of the claims are various, much depending on the weather.

The engraving given herewith shows a party of Shetlanders working the black sands on the beach near Charleston. They use the peculiar New Zealand beach-box, shown in the engraving. Water is brought into the rifles by means of hose at the rear end.

Many of the "beach-combers" are of the opinion that the gold on their claims comes from the depth of the sea during the storms, and not from the inland workings, as many others suppose. It is, however, a difficult question to determine.

A DISPATCH dated Guaymas, 28th instant, says: Quite a party of Mexicans, most of them capitalists, have arranged a trip to the new gold mines on the Antonio. Careful investigation shows that the first parties who went on the gold fields failed to prospect beyond the immediate reach of water. The largest nugget yet brought from there was shown yesterday, weighing some four and a half pounds. All the American miners who have the means are going back.

The damage by fire on the Island of Gutajewsky, at the north of the Neva is now estimated at 10,000,000 rubles.

lies. It shows that we are in the Gulf Stream of Time. And the fact is undeniable, that as fast as the nations of the earth come upon a certain plane of civilization they feel in their veins the warm pulsations of civil and religious liberty. John Stuart Mill, Herbert Spencer, Walter Baghot, and, indeed, all the great writers on the political questions of the ago, admit the fact. Even the crowned heads of Europe confess it, and only hope to guide the movement a little while longer, relaxing the reins of absolute power as slowly as they can. Forty years ago M. D. Tocqueville said that he did not believe that a democratic form of government was the best thing for the world, but

CORRESPONDENCE.

English Investments in Pacific Coast Mines.—No. 6.

The Sutro Tunnel and English Capital Origin, and Early History of the Enterprise.

[Prepared for the MINING AND SCIENTIFIC PRESS BY H. DREKOOT.]

Although the Sutro Tunnel company is a Nevada corporation, it may for the purposes of this writing, be properly treated as an English concern, inasmuch as English capitalists have furnished nearly all the money required for prosecuting that work, and have almost from the first controlled the affairs of the company. The object of this enterprise was the construction of a tunnel designed to intersect the Comstock lode at a depth of 1,600 feet or more, and to be used for ventilation, drainage and working purposes. The originator and active promoter of this project was Adolph Sutro, whose name it bears, and who, conceiving the idea as early as 1861, began soon after agitating the subject, though no steps were taken looking to the inauguration of active measures until 1864. In the fall of that year, Mr. Sutro applied to the Legislature of the State of Nevada for a franchise, with right of way for such tunnel, which, in the month of February following, was granted to the applicant and his associates. This accomplished, a company was formed for undertaking this formidable work, some of the large mine owners and prominent citizens of Nevada being on the Board of Directors. While there were so connected with the company at the start, some of the more influential citizens of the State, to Mr. Sutro belongs the merit of first moving in the matter, though the idea of its importance is said to have been, in the first instance, suggested to his mind by others.

How He got the Original Idea.

Now, Mr. Sutro was not himself a mining engineer, nor even a practical miner. He had never been to Freiberg, and knew little about driving adits, drifts, crosscuts, or other underground works. He had been brought up to other pursuits, and had, till the time of his emigrating in this enterprise, been engaged in the laudable, because necessary, occupation of furnishing to our tobacco snuffing, tobacco chewing and tobacco sucking population enough nicotine to enable them to digest their virtuous. With the rush of emigration to Washoe, he had gone over to Virginia City for the purpose of establishing there a branch house in his business. Sojourning at this active center of mining, he happened to overhear one day some educated engineers discussing the question of a deep-dyng tunnel to drain and work the Comstock lode, citing, in the course of their conversation, the utility of such works, as demonstrated at various points in Europe. From the hint so thrown out, Mr. Sutro, it is alleged, gained his first idea in regard to a scheme of this kind. Now that it may not be supposed that Mr. Sutro was eaves-dropping on the occasion alluded to, it should be explained that the Washoe hotel of that day was a flimsy concern, consisting of a huge sheet of cotton-drilling stretched over a light wooden frame, so fluffy and loose of texture that the occupant of one apartment could not help overhearing what was being said in another, whether adjoining or some distance away. So, if Mr. Sutro did hear what these gentlemen from Freiberg, Clanshal, or elsewhere, happened to be talking about, it was no fault of his, nor was there any impropriety in his appropriating and acting on the suggestion so thrown out, even if he did do this, the tradition being rather apocryphal, anyhow. But however Mr. Sutro first became possessed of this idea of driving a tunnel, he certainly managed to get it, and what was more, managed to make a good deal out of it in the end.

The Mine Owners First Favor and Then Oppose the Project.

The leading mining companies on the Comstock lode were at first so favorably impressed with the utility of the proposed tunnel, that they contracted with Mr. Sutro to pay him a royalty of two dollars per ton for all the millable or marketable ore taken from their mines, after the work was finished, Mr. Sutro binding himself to have it completed by a certain date. In 1866, Mr. Sutro procured an act of Congress to be passed, confirming the right of way granted to him by the Nevada Legislature. This act also empowered him to purchase, at a nominal price, several thousand acres of land at the mouth of the tunnel, donated to him large sections of any mineral bearing lodes that his tunnel might intersect, and made "it obligatory on the mining companies to pay the stipulated royalty, since, by compromise between the parties, reduced to one-half."

Meantime, Mr. Sutro, though he had succeeded in getting nearly \$1,000,000 subscribed for the stock of his company, delayed active operations, no work having been done upon the much talked of tunnel till near the end of 1869, when a beginning was made with a small force of men. Distrusting Mr. Sutro's ability to get through with the work by the time agreed upon, the mining companies sought to repudiate their contract with him, a movement that pre-

vented Mr. Sutro from getting any more subscriptions for his stock, many refusing to take shares already subscribed for. Then, too, the mine owners had begun to think that the tunnel might not be so very useful after all. They had by this time equipped their mines with powerful hoisting works, whereby the lifting and lowering service could be performed speedily and cheaply. They had erected mills near by and a railroad had been projected for carrying their ores to the Truckee, where, with water power, they could be crushed at a small cost, the returning cars bringing in fuel, lumber and other supplies. Out of this aspect of affairs, differences arose between these parties, which, as neither showed any disposition to yield, grew at last into open hostilities; the result of which was to destroy all chance of Mr. Sutro's raising the money necessary for building his projected tunnel, in this country. To canvass the merits of the contest waged between these parties, would require more space than could here be spared for that purpose; suffice to say, it was bitter and protracted, Mr. Sutro carrying on the fight with great persistence; tact and energy. That he met with partial defeat and was forced to apply elsewhere for financial aid, is no disparagement to the justice of his cause or the ability with which he maintained it.

He Goes to England and Makes a "Raise."

Reduced to this strait—his last hope of raising money on this side extinguished, Mr. Sutro packed his valise and taking his franchises and subsidies hid him to England to see what, if anything, could be done with these valuable muniments over there. Arrived in London, conditions seemed to favor the object of his mission. The British people had by this time heard much of the Comstock lode. They had long desired to become sharers in its great wealth, but interests in these mines had been advanced to such terrific figures that they could not think of buying "feet" at the then ruling prices. But here was now an opportunity to acquire valuable interests in the great Washoe lode at a moderate outlay, there being even a chance of capturing the whole thing in the not remote future; for, Mr. Sutro had demonstrated that whoever controlled the tunnel would be able to control the mines also—in other words, the owners of this structure would eventually become the owners of the Comstock itself.

Now, Mr. Sutro is a good talker, he may almost be said to be a natural orator. Few men are better able to present a case of this kind in a forcible and taking manner. With a large brain and a cheek of chilled iron, nothing discourages, nothing disconcerts him! Imaginative, self-reliant, extravagant in his statements, even reckless of facts, he talks on with a placidity, audacity, plausibility and fluency that, if it does not always confound an opponent is very apt to captivate an unthinking hearer.

That a man so gifted in his peculiar and off-hand way should have favorably impressed our English cousins and even succeeded in taking them in badly is not very strange. Besides, the person of the Albion had not as yet been much lacerated by the claws of the American "wild cat," wherefore, he stood then in less dread of the ferocious beast than he now does. This feline was then a mere kitten in his Washoe lair, having scarcely as yet gotten his eyes open.

What further tended to recommend Mr. Sutro and his cause to the good graces of the average Englishman was the fact that he came among them in the guise of a persecuted and injured individual—a sort of Columbus, seeking aid to discover a new world—a prophet as it were, without honor in his own country. Now however John Bull may sometimes show himself a little brusque toward a neighbor, he is notoriously a lover of fair play, especially where its enforcement and a tolerable interest on the investment go together. So, when Mr. Sutro related his tale of woe, recounting how he had been wronged and abused by the "blasted Yankees," the sturdy Briton listened with many expressions of sympathy and encouragement. "Av, to be sure!" "quite so, Mr. Sutro, quite so," was disposed to "elp the poor man" in his extremity, "would be 'appy to do the right thing ye know," etc., etc. Mr. Sutro knowing this to be one of the infirmities of Bull, took care to play it for all it was worth, the outcome of some hurried conferences had between our Washoe adventurer and British capitalists being an agreement on the part of the latter to furnish the money required to carry on and complete the Sutro tunnel, the sum named by the projector as necessary for that purpose being about \$3,000,000. This, as Mr. Sutro well knew, would be altogether too little to complete the job, but he knew equally well that these parties, having put in that amount of money, would, as a matter of self-protection, be forced to supply whatever more might be needed to put the work through, and so contented himself with naming such moderate sum. The funds being forthcoming, the bulk of the stock carrying with it control of the management, was transferred to the new shareholders. Mr. Sutro, who retained a certain amount of the stock, was appointed superintendent in the field, and operations on the tunnel, which had up to this time been lagging, were thenceforth pushed with great vigor.

The Work Hurried on and Brought to Completion—Mr. Sutro gets out and Makes Money.

From the time operations were so resumed on the tunnel, which occurred in 1871, they were continued without further interruption till 1879,

when the main adit, 20,489 feet long, was finished. Since that time the company have been engaged driving the lateral tunnels, the one running north and the other south along the Comstock lode, and a little below it. The main tunnel, which approaches the load at right angles, intersects it in the Savage ground at a depth of 1640 feet below the croppings. The two lateral tunnels, which have reached a combined length of some 3,000 feet, are being pushed actively ahead, the intention being to extend them to all the more productive and promising mines on the mother lode. This system of tunnels is, throughout, in good condition, though the work of keeping them so has proved a heavy drain on the company's slender resources, more or less retimbering and other costly repairs being every year called for. The management from the first seems to have been economical, energetic and judicious; even Mr. Sutro's administration could not, in this respect, have been improved upon. The company, while they complain that this gentleman deceived them, in that he sold his stock after agreeing to hold on to it, concede that he managed their affairs well. That Mr. Sutro acted in bad faith in the above particular, seems probable enough, having thrown his entire holdings on the market when at its highest, to the great detriment of the company's interests. Out of these sales Mr. Sutro is said to have realized over two million dollars. The question suggests itself whether or not money obtained by such and kindred means is worth what it costs; some people think it is!

As regards the future,

The Outlook for the Sutro Tunnel Company

Can hardly be considered flattering. The total expenditures of the company to date amount to nearly \$8,000,000. Of this sum over \$1,250,000 consist of borrowed money, secured by mortgage on their entire property. Their revenues from all sources for the year ending March 1, 1883, amounted to \$63,213, of which \$47,627 consisted of royalties collected from the mining companies, the balance being derived from the sale of produce raised on their ranch, the income of real estate in the town of Sutro, and sundry minor sources. The disbursements of the company for the year reached \$100,000, exceeding their income by about \$37,000, which sum was borrowed to meet the deficiency.

The annual expenditures of the company, considering how much it costs to keep their tunnels in order, must continue about the same as at present. To what extent their income may be increased hereafter, will depend mainly on the ore developments made in the lower levels of the Comstock mines, which just now are somewhat promising. Should large bodies of high or even fair grade ore be opened up here, the company might be able to relieve themselves of their present indebtedness, defray current expenses, and possibly pay some small dividends. Failing in such developments, this of course could not be done, and the property of the company would probably be sold to satisfy the mortgage resting upon it. The show for finding any large amount of pay ore in the lodes cut by the company's main tunnel, and owned by them, is not encouraging, notwithstanding their superintendent reports such mineral indications in one of these lodes as, in his opinion, justifies its further exploration.

Taking the most hopeful view of the case the Sutro tunnel must be pronounced a somewhat dubious investment. It is true, the trustees of the company in their last report speak in a rather assuring tone, telling the shareholders that their tunnels are, for the most part, in prime condition, and that the flow of water continues uninterrupted, though there is no intimation that they intend to reservoir this flow and declare an aqueous dividend. Apropos to the above remark it may be stated that this tunnel water is decidedly warm and highly mineralized, which latter is more than can be said of the Comstock ores just at present. Should the venture prove a final disappointment these shareholders will have only themselves to blame. Investing their money in the way they did they could have expected no other issue. How they came to be taken in by a man like Mr. Sutro, despite his fine presence and persuasive methods, is something surprising. The circumstances under which he came to them, a stranger, impetuous and without credentials, were certainly enough to have excited suspicion and put them on their guard. The man's evident inexperience in mining, the story of his grievances, in short, every incident and fact connected with his advent in London, amounted to a broad enunciation of the legal maxim, "caveat emptor." But, however this tunnel may disappoint the luckless shareholders, it has probably caused no disappointment to Mr. Sutro himself. It has, no doubt, accomplished all the projector ever expected it to do, having drained the Comstock lode to a depth of 1,600 feet, and the pockets of the English investors to a much lower level.

THE MECHANICS' FAIR.—The price of tickets for the next Mechanics' Institute Fair will be: Double season ticket, admitting two, \$5; single, \$3; children's season, \$1.50; apprentices, \$1.50; adult single admission, 50 cents; children, 25 cents. To members of the institute in good standing—that is, those not in arrears for dues—double and single season tickets will be sold at half the above rates. The Directors believe by this reduction to greatly increase the membership of the Institute, which costs but one dollar to join and fifty cents a month for dues.

Arctic Currents.

Along the Alaskan and Siberian Coasts.

[Abstract of a paper read before the California Academy of Sciences by Captain C. L. Hooper, of the U. S. Revenue Marine.]

On account of the varied and extensive duties assigned to the *Corwin*, and the limited time in which to perform them, a regular connected series of current observations in Behring strait was not taken as it was hoped to do. It was my intention to return for that purpose, after dispatching a sledge party along the Siberian coast early in June. But the rough treatment received by the vessel in the ice-pack, resulting in the loss of rudder and other damage, necessitated a change of plans. It became necessary to seek a place of comparative safety with the vessel where the rudder might be repaired, and, to entrust the current work to a boat's crew, left for the purpose on the West Diomed, an island in Behring strait. Unfortunately, the boat's crew accomplished nothing. Owing to boisterous weather, the boat could not be launched. So much time was consumed in making the necessary repairs, owing to the fact that all the harbors were still frozen up, and we were compelled to make them at sea, that I did not feel justified in remaining longer in the vicinity of the straits, but pushed on to the northward as fast as the ice would permit. Consequently, we were limited in our

Current Observations

To such as could be made, from time to time, by noting the drift of the large masses of ice by comparison of the ship's position, as shown by dead reckoning, and that shown by observation, and by noting the velocity and direction of the current when at anchor. And as we remained at anchor but little, the latter class of observations were seldom taken, and never in a sufficiently connected form to be of much value. Many of our observations were taken in the vicinity of the ice-pack, and as this pack where found occupies about one-third, and in many places one-half, of the entire depth of the shallow Arctic sea, it exerts as much influence on the surface currents as a body of land of the same area, and as the pack, or that portion of it which we are able to observe, is constantly changing its position—not only from month to month in the same season, owing to the destruction of the ice by melting, difference of prevailing winds, etc., but also varies its position from season to season according to the amount of ice formed during the previous winter—it will readily be seen that the consequence is constant change in the force and direction of the current, and the result of one set of observations in the vicinity of the pack is but slight indication of what may be found by the next observer.

In addition to these constant changes in the

Vicinity of the Ice Pack.

Other difficulties are encountered in making observations on the currents, while a vessel is cruising from place to place. Owing to almost constant fogs, it frequently occurs that several days pass without an observation for position. Then, if a difference is found to exist between the position by dead reckoning and that by observation, which can only be accounted for as a current, it is impossible to determine in what part of the ship's track, the current was encountered, how much is due to the tidal current and how much to the wind. There is yet another difficulty encountered by navigators in high latitudes, which bears upon this subject, that of accurately determining the ship's position by observation, even in clear weather.

The same causes interfere with the accurate location of "coast lines," and no doubt account for errors that are often attributed to other causes. When we consider the extent of these difficulties and the fact that they are almost constantly encountered, it will readily be seen that any theory, based upon a few observations taken by one, or even several vessels, from time to time, and in different parts of the Arctic ocean, rests upon slight grounds, and is susceptible of grave error, and that unless supported by evidence of a more definite character, it should be given but little weight. And in submitting the results of my observations, during the cruise of the *Corwin* in 1881, they are subject to these explanations. Perfect accuracy is not claimed; they are, however, in the main, correct, and taken in connection with other facts, to be presented, must have their weight.

On the 28th of May, the *Corwin* anchored at St. Lawrence Island, and

Swung to a strong Northerly Current, Which, however, slackened and indeed, entirely stopped, a few hours later. This change was undoubtedly due to tidal action. Although the wind was from the northward, it was very light and not sufficient to influence the current to any extent.

On the 30th of the same month, while anchored at West Diomed, the ice was observed to be setting to the northward, at about two knots per hour. The wind blowing fresh from southeast with snow squalls.

During the night of June 3d, the *Corwin*, while trying to get south through Behring strait, was met by a large body of ice drifting through into the Arctic ocean from Behring sea, which completely filled the strait; and being compelled to heave to until the next forenoon, the direction of the current was found to be northwest and its velocity about one-half a mile per hour; weather calm.

(CONTINUED ON PAGE 438.)

MECHANICAL PROGRESS.

Damascus Steel.

The term "Damascus steel," or, as it is frequently called, Damascus blades, is applied to a kind of steel which shows a variegated watery appearance on the polished surface. It came originally from Asia, and the scimitars or swords chiefly from Damascus, where the art of manufacturing blades appears to have been best understood. The excellent quality of this cutlery, particularly the scimitars, has long been proverbial; no other steel has been found to equal it in tenacity and hardness. The process by which this steel is worked is not known; it is a secret faithfully preserved among those who are engaged in the manufacture. European artisans and scientific men have endeavored to imitate the Asiatic damask, but with ill success; the form and appearance of the steel has been counterfeited, but its quality has never been equalled. French manufacturers, particularly, have wasted a great deal of time and means in such attempts. The probable cause of the superior quality of this steel is in the raw material, the ore; and it may in some measure be attributable to the skill of the artisan who manufactures the blades. It has been ascertained that the ingots of wootz of which the oriental Damascus is made come from Golconda, and it is, therefore, probable that it is manufactured in the same manner as the Indian wootz. This supposition is strengthened by the great value of the blades, and the peculiarities of the wootz.

Alexander Burns, in his journey to Cabool, tells us that a scimitar was shown him in that city which was valued at five thousand rupees, and two others at fifteen hundred rupees each. The first was forged in Ispahan, in the time of Abbas the Great. The peculiar value of this weapon consisted in its uniform damask; the "water" could be traced upon it, like a skein of silk, the entire length of the blade. Had this "water" been interrupted by a curve or cross, the blade would have been of little value. One of the cheaper weapons was also of Persian make; its "water" did not run straight, parallel with the blade, but was waved like a watered silk fabric. It had belonged to Nadir Shah. The third scimitar was a Khorassan blade; there were neither straight nor waved lines in it, but it was mottled with black spots.

All three blades were strongly curved, but the first was more so than the others. They tinkled like a bell, and were said to improve by age.

Imitations of Damascus steel are made daily, and have been made for the last 50 years, and there is no doubt that some good has resulted from these experiments. The real value of the imitations, however, is quite limited. Damask steel has been made, and is made of such perfectly developed veins, by welding together bundles of small slips of steel and iron, or steel of different kinds, that all imaginable figures which can be delineated by hand have been imitated. The smoothed water, the waved water, a tension of the damask, and the spotted damask, have all been produced; names, letters, inscriptions, leaves and flowers have been represented; but all these pretty things do not make Damascus blades of equal quality with those of Asiatic manufacture. It appears the Persians do not use so much skill in forging, but depend upon the elements. Recent experiments have shown that when blades are cooled slowly, as by swinging them in the air, a damask is produced on steel highly charged with carbon. This, however, is nothing new; for the next best blades to those of oriental manufacture—the blades of Solingen—have been hardened or tempered in that way for centuries. It is certainly the most perfect mode of hardening steel, where tenacity also is desirable.

It is said that one hundred parts of soft iron and two parts of lamp-black, melted together, make a fine steel of great strength. It is also said that equal parts of cast and wrought iron turnings make a fine steel, of damask quality, which is superior for arms and edged tools.

There is no doubt that, by such means as the foregoing, an imitation of the appearance of damask steel may be effected; but it will depend entirely on the quality of the steel, the iron, the cast iron, the lamp-black or the crucibles whether the resemblance will extend to the quality of the steel.

Damask veins may be made to appear on the surface of polished steel by washing it with a thin solution of sulphuric or muriatic acid, which will dissolve the softer parts of the steel first on those points which contain the least carbon; after which the steel is washed in fresh water, and oiled or waxed. It is not known whether or not the Orientals bring out their damask in a similar way. Steel is sometimes buried underground, often for months together, to improve its quality. May not this be the manner in which the Orientals etch their blades? —Blacksmith and Wheelwright.

Why Iron Chills.

For chilling cast iron, says a writer in the *American Machinist*, different pieces require different treatment, but there is one essential point to be borne in mind, that is, the chill should be covered as quickly as possible. It is impossible to do this too quickly, providing the surrounding parts of the mold will stand it.

The hotter and more liquid the iron, the deeper and smoother the chilled surface will be.

The process of chilling iron involves a chemical change in the part chilled. That part contains carbon in a combined form, while the parts of the casting that are not chilled contain carbon in two forms, graphite uncombined, and combined carbon in a less degree than the chilled parts.

Cold blast iron contains a larger per cent of carbon than hot blast iron, and when liquid cold blast iron comes in contact with a chilling surface, the sudden lowering of the temperature produces the chemical change which results in what is called a chill. The more liquid the iron, the deeper and more complete the process of converting the uncombined into combined carbon. When this change is made, so far as my observation goes, it is permanent. Even remelting does not undo the transformation.

A number of years ago there were made in the shop where I worked several large castings that were chilled from one inch to two inches deep. Some of these castings were condemned for imperfections. They were made from the best of iron—"Richmond" and "Saulsbury"—and the foreman concluded to put the condemned castings into locomotive driving-wheels. They were broken up and cast, and every wheel broke like an icicle when being pressed on the axle.

The castings I speak of were for safes, and one was taken from the sand while red and subjected to the cooling effect of a stream of water. This was done to demonstrate that in case of water being played upon them at a fire there would be no danger. When this one mentioned was cooled by means of water, it was broken up like a piece of ice; in fact, a laborer, with hob-nailed shoes, literally granulated portions of it beneath his feet. This showed the chemical change going on to the end of the cooling process.

Now, then, cold blast iron is the strongest of irons, yet it contains combined carbon in a greater degree than hot blast iron, which proves that, to a certain extent, its presence increases its tenacity, and beyond that it decreases the strength of the metal.

PHOSPHORIZED NICKEL.—Pure nickel, after melting and casting, generally holds a greater or less quantity of oxygen in solution, and the metal is brittle. To hinder the injurious effects of the oxygen, it is necessary to incorporate in the melted nickel some substance which has a strong affinity for oxygen, and also for the nickel itself. J. Garnier finds that phosphorus serves both of these purposes very satisfactorily, producing effects analogous to those of carbon in iron. If the phosphorus does not exceed three-tenths of one per cent, the nickel is soft and very malleable. Above this quantity the hardness increases at the expense of the malleability. Phosphorized nickel, when alloyed with copper, zinc or iron, gives results which are far superior to those that are obtained from the same nickel when not phosphorized. By means of the phosphorus, Garnier has been able to alloy nickel and iron in all proportions, and always to obtain soft and malleable products. The contradictions of illustrious chemists are thus explained, some saying that such alloys were brittle, others that they were malleable. The latter had alloyed the nickel to phosphorized iron.

METALLIZATION OF TIMBER.—The Rubemnick process for metallizing wood consists in first immersing it in a bath of caustic alkaline lye, in which it is allowed to remain for two or three days, according to the degree of permeability of the wood, at a temperature of 167° to 194° Fahr. From this bath the wood passes to another of hydrosulphate of calcium, to which is added, after twenty-four or thirty-six hours, a concentrated solution of sulphur. Here it remains for about forty-eight hours, at a temperature of 95° to 122° Fahr., and, lastly, for from thirty to fifty hours, the wood is immersed in a solution of acetate of lead at the same temperature. The timber, thus pickled, is allowed to dry, when it is said to be susceptible, after burnishing, of a high polish, and even a metallic luster, which is more brilliant if the surfaces of the wood have been previously rubbed with lead, tin or zinc plates, and then polished with a glass or porcelain burnisher. Treated in this way, the wood may assume the appearance of a metallic mirror, being at the same time hard and very strong.

HOLLOW BRICK WALLS.—The question is often asked—"Are hollow brick walls better and stronger than solid walls?" For instance: Brick building, four stories, first floor earth; second story, machine shop, say fifteen tons; third story, stove shop, say nine tons; fourth story, light goods, say six tons. The *Scientific American* answers as follows: The tremor of factories is more severe upon hollow walls than upon solid walls, unless more than the quantity of material in a solid wall is put into a hollow wall. It is the weight of material in the walls that counteracts tremor and swaying. A hollow wall under any circumstances for factories should be thoroughly bonded at small intervals.

MR. J. B. SHERMAN, of Boston, is reported to have recently concluded a series of experiments upon a new metal discovered by him, with a view of ascertaining its adaptability for telegraph wires. The experiments, it is said, have yielded results favoring the adoption of the new material, which is reported to have the appearance of silver, and costs to produce about five cents a pound.

SCIENTIFIC PROGRESS.

Labor and Food.

The human body never ceases to work. Even in the most profound slumber some of the functions of life are going on, as, for instance, breathing, the circulation of the blood, digestion, when there is food in the stomach; and it follows that some part of the nervous system is, therefore, awake and attending to business all the day and night long. In the act of living, some of the substance of the body is being constantly consumed. The amount of work done by the heart in one day in propelling the blood is now estimated as equal to the work of a steam engine in raising 125 tons one foot high, or one ton 125 feet high. We lose in weight by working. Weigh a man after several hours' hard labor, and he will be found two or three, and, in extreme cases, several pounds lighter. If we do not wish to become bankrupt, we must replace by food the amount we have lost by labor. Hunger and thirst are the instincts which prompt us to do this. They are like automatic alarm clocks, which stop the engine at various points to take on fuel and water. In a healthy man as much is taken in as is required to maintain the weight of the body against loss. Nature keeps the account. On one side is so much food spent in work; on the other, so much received into the stomach for digestion. They should balance like the accounts of an honest book-keeper. In an unhealthy person the instinct of hunger becomes disordered and does not sound the alarm, and so the person goes on working without eating until he becomes pauperized; or the instinct works too frequently, and he eats too much and clogs the vital machinery. A calculation of the business done in the body reveals the fact that for a hard working person about 8½ pounds of food and drink are used up daily; some bodies use more and some less, but this is the average. The profit which the body gets on this transaction has been calculated, and may interest our readers. The energy stored up in the 8½ pounds of food ought to raise 3,400 tons one foot high. Most of this energy, however, is expended in keeping the body warm and its functions active. About one-tenth can be spent in our bodily movements or in work. The profit, then, on the process is about ten per cent. This is enough to raise 340 tons one foot high each day. A profit which is quite enough for earning a good living if rightly expended, and it is probably more than most make, but all ought to strive to reach this point if possible. —*Scientific American*.

The Value of Metals.

Following are the names of those metals valued at over \$1,000 an avoirdupois pound, the figures given representing the value per pound: Vanadium—A white metal discovered in 1830, \$10,000. Rubidium—An alkaline metal, so called from exhibiting dark red lines in the spectrum analysis, \$9,070. Zirconium—A metal obtained from the minerals zircon and hyacinth, in the form of a black powder, \$7,200. Lithium—An alkaline metal; the lightest metal known, \$7,000. Glucinum—A metal in the form of a grayish-black powder, \$5,400. Calcium—The metallic base of lime, \$4,500. Strontium—A malleable metal of a yellowish color, \$4,200. Terbium—Obtained from the mineral gadolinite, found in Sweden, \$4,080. Yttrium—Discovered in 1828, is of a grayish-black color, and its luster perfectly metallic, \$4,080. Erbium—A metal found associated with yttrium, \$3,400. Cerium—A metal of high specific gravity, a grayish-white color, and a lamellar texture, \$3,400. Didymium—A metal found associated with cerium, \$3,200. Ruthenium—Of a gray color, very hard and brittle; extracted from the ores of platinum, \$2,400. Rhodium—Of a white color and metallic luster, and extremely hard and brittle. It requires the strongest heat that can be produced by a wind furnace for its fusion, \$2,300. Niobium—Previously named columbium, first discovered in an ore found at New London Conn., \$2,300. Barium—The metallic base of baryta, \$1,800. Palladium—A metal discovered in 1803, and found in very small grains, of a steel-gray color and fibrous structure, \$1,400. Osmium—A brittle, gray-colored metal, found with platinum, \$1,300. Iridium—Found native as an alloy with osmium in lead-gray scales, and is the heaviest of known substances, \$1,000.

PHILOSOPHY OF QUIETING THE WAVES WITH OIL.—Van der Meushrugge reasons as follows to explain the effect produced by a thin stratum of oil spread over the surface of the sea to quiet the water: To increase the surface of a mass of water, a certain amount of force is required, and this force is stored away, as potential energy, in the superficial layer of the water. Also, when the free surface of the mass of water is decreased, proportionate amount of this potential energy is changed into kinetic or actual energy. Thus, when one stratum of

water is brought—say by the wind—over another, the potential energy of this latter is changed into kinetic energy, and a certain velocity is generated. When, however, one stratum of water is brought upon another covered with a thin layer of oil and, consequently, having less potential energy than the first, the amount of force transformed into kinetic is considerably less than that remaining as potential energy. In other words, there would be a continual disappearance of actual force, and this would explain the tendency of the waves to subside much more quickly than when no oil is present. —*Comptes Rendus*.

Nature in Siberia.

"The history of animal and vegetable life on the tundra," says our author, "is a very curious one. For eight months out of twelve every trace of vegetable life is completely hidden under a blanket six feet thick of snow, which effectually covers every plank and bush—trees there are none to hide. During six months of this time, at least, animal life is only traceable by the foot prints of a reindeer or a fox on the snow, or by the occasional appearance of a raven or snow-owl wandering above the limits of forest growth, where it has retired for the winter. For two months in midwinter the sun never rises above the horizon, and the white snow reflects only the fitful light of the moon, the stars, or the aurora borealis. Early in February the sun only just peeps upon the scene for a few minutes at noon, and then retires. Day by day he prolongs his visit more and more, until February, March, April and May have passed, and continuous night has become continuous day. Early in June the sun just touches the horizon at midnight, but does not set any more for some time. At midday the sun's rays are not enough to blister the skin, but they glance harmlessly from the snow, and for a few days have the anomaly of unbroken day in midwinter. Then comes the south wind, and often rain, and the great event of the year takes place—the ice on the great rivers breaks up, and the blanket of snow melts away. The black earth absorbs the heat of the never-setting sun; quietly and swiftly vegetable life awakens from its long sleep, and for three months a hot summer produces a brilliant Alpine flora, like an English flower garden run wild and a profusion of Alpine fruit, diversified only by storms from the north, which sometimes for a day or two bring cold and rain down from the Arctic ice." —*Chambers' Journal*.

OBSERVATIONS ON SOUND.—The following curious observations on sound have been carefully verified by an extended series of experiments: The whistle of a locomotive is heard 3,300 yards; the noise of a railroad train, 2,800; the report of a musket and the bark of a dog, 1,800; an orchestra or the roll of a drum, 1,600; the human voice reaches to a distance of 1,000; the croaking of frogs, 900; the chirping of crickets, 800. Distinct speaking is heard in the air from below up to a distance of 600 yards; from above, it is only understood to a range of 100 yards downwards. It has been ascertained that an echo is well reflected from the surface of smooth water only when the voice comes from an elevation. Other similar phenomena connected with the transmission of sound have been observed, but the results disagree, either from inaccuracy in the observations or from the varying nature of the circumstances affecting the numbers obtained. Such variations occur to an extent of 10 per cent. to 20 per cent., and even more. The weather being cold and dry, or warm and wet, are the chief influencing causes. In the first place the sound goes to a greater, and the second to a lesser distance.

PERMANENT LAMP ATTACHMENT.—MR. C. H. Stearns, F. R. S., has recently introduced an interesting application of the incandescent lamp to microscopes. A small Swan lamp of two or three candle power is permanently attached to the microscope, and serves in place of the ordinary oil lamp, over which it has the advantage of requiring no cleaning, giving off no smell or much heat, and yielding a purer light. The great care and facility with which the lamp can be adjusted is beyond comparison with the ordinary gas or oil flame, especially when the light has to be shifted to above or below the stage for illuminating opaque or transparent objects. Condensers may also be got rid of by its use. The light of the lamp is controlled by a small resistance coil, and two or three Grove or Bessmer cells are sufficient to work it.

IRON AND STEEL MAGNETIZED BY BREAKING.—At a recent meeting of the Society of Physical and Natural Sciences, Karlsruhe, M. Bissinger made a communication on the magnetization of bars of steel and iron when broken on the machine, serving to test them. The phenomenon is not due to elongation of the bar, but to the actual breakage; and both parts are converted into two magnets of sensibly equal power. The shock and trembling of the metal on breaking, is probably the cause of magnetization. According to Professor Hughes' recent experiments, in the testing machine, the bars are placed vertically, and the south pole is formed at their upper part. The different iron objects near the machine, at the moment of rupture and vibration, are also magnetized, but to a less degree.

GOOD QUARTZ.—Plumas *National*, June 23. Quartz prospecting is all the rage on the East branch and some good ledges are being opened. The work on the Hallsted ledge on Rich gulch, proves that it is rich and of vast extent, and several other fine cropings have been found in the same locality. One day last week Mr. McPherson, of Meadow valley, found what is supposed to be the northwest extension of the Hallsted ledge, on the Deadwood side of the mountain, and he has quartz which shows fine gold and is very rich. Fred Lewis has some good quartz, and the indications point to a large and lively quartz mining camp at that place in the near future.

Mining stocks have been rather dull for a week, and the brokers adjourn over from Saturday until next Thursday. Our tables show the slight fluctuations in the market. All interest now centers in Union Consolidated. Although the streak of ore cut by the crosscut in the first winze and Sierra Nevada crosscut on the 3,000 level is spoken of as being four feet in width, the quartz formation at that point is really much wider. There is about four feet of solid quartz, then quartz and porphyry are sandwiched in for several feet to the west, quartz predominating. This appears to be the top of a new formation that has no connection, as far as can be seen, with the ore vein cut on the 2900 level. How far the west crosscut may yet have to go before reaching the ore body for which it was started nobody can say, as no one can tell what changes of dip may have occurred in the walls of the vein below the 2,900 level. When cut above the vein showed every indication of being the top of an ore body. In the Union ground a raise was made on it, and it was found to wedge out at the height of twenty feet, while it seemed to be rapidly widening in going downward. This ore vein is about 500 feet east of the west wall of the Comstock lode, and it is worthy of note that the point where the big bonanza in the Consolidated Virginia and California was first cut, at the south end, was about the same distance from the main west wall. The west wall of the ore streak, where last seen on the 2,900 level, was going down almost vertically. The *Enterprise* thinks there is nothing to prevent it turning for a time toward the west, for should it go straight down it would not reach the west wall of the lode much under 500 feet. All the big ore bodies of the Comstock have been found to go down straighter than the main west wall of the lode, and have eventually brought up against said wall. The present prospects are well out towards the middle of the lode.

San Bernardino.

BORAX DEVELOPMENTS.—*Calico Print*, June 23: Work on the borax claims in East Calico which were recently purchased by C. L. C. & Co. has been progressing ever since the company obtained possession of the property. Several men are employed in taking out borax. The deposits that are being opened up are large and of a high grade. We learned from F. M. Neel, the foreman, that a building 14x40 ft. is to be erected on one of the claims in a few days, and that it was not yet decided how soon reduction works will be built for manufacturing the borax.

LOVE STAR.—This claim is situated in West Calico about two and a half miles from town, and has recently been bonded by H. H. Spencer, of Los Angeles. Some work had already been done on the mine including a tunnel and an incline shaft of 30 ft. Mr. Spencer intends to put on a force of men and proceed to open up the mine expeditiously and in good shape.

INVISIBLE.—Mr. Whitmore has, up to date, been quite successful in the development of this fine property. The returns from ore milled have been quite satisfactory, and it is expected that the 20 tons now on the dumps will realize more bullion to the ton than any ore yet milled.

TAGGART.—Two men are at work in this promising mine taking out some exceedingly rich ore filled with red and wax silver. They are working on the west side of a bluff, and have opened up a fine body of ore by sinking an inclined shaft 20 ft. The owners are very much pleased with their prospects. They will soon ship what ore they have on hand, but will shut down operations on the mine in a few weeks until the hot weather is over.

GARTFIELD.—Operations in this mine continue without any diminution in the richness of the results. Sinking and drifting are daily advancing in the midst of fine bodies of ore. The ore is free milling and is extracted and loaded on the teams without much expense. Over 200 tons of ore have been hauled from this mine to the Oriental mill, the pulp assays of which average 110 ounces to the ton, and which, it is thought will net above \$20,000.

Sierra.

GOLD LAKE.—*Mountain Messenger*, June 23: All the claims in this rich mining district are yielding large returns this season. Cox, Myers, Dorsey and others are having good cleanups. Mr. Dorsey brought a nugget, worth \$60 to Sierra City, the other day. Last week, Thursday and Friday, Foss & Den-nire picked up on the bedrock over \$3,000 worth of specimens, one valued at about \$1,400. The water season has been very short.

SIERRA BUTTES.—*Sierra Tribune*, June 22: The Sierra Buttes mine at Sierra City is undoubtedly the best managed mine in the State. For 14 years, during which time the present company has owned the property, there has been a monthly dividend declared regularly. Tunnel No. 8 is now in a distance of 4,200 ft. From this tunnel to No. 7 above not a pound of ore has been disturbed. No. 9 tunnel, several hundred feet still lower down the mountain side, was started last year, and at this time is in 2700 ft. The ledge was tapped a few weeks ago and the course of the tunnel was changed somewhat in order to follow the vein. There are several distinct pay chimneys of ore in the mine and it will be necessary to run the lower tunnel into the hill one and a half miles to reach all of these. Although the mine has been worked on a mammoth scale for over 20 years, it would seem that work was just beginning and it is impossible that a century would give time enough to exhaust the immense bodies of ore that are being opened out. Dr. Sawyer paid a visit to the root drift mine last Sunday. This mine is located a couple of miles east of Sierra City. It is strictly a home enterprise, a large amount of money having been expended by residents of that section in developing the claim. The channel was encountered a short time ago and gravel that is being taken regularly now yields handsomely. Six dollars was taken from two pans of dirt that was picked up out of the dump Sunday. Supt. Shaw started the work of sinking in the main shaft of the Marguerite mine last week. The 20 stamp mill is pounding away day and night on ore that will probably average \$15 per ton. Messrs. Abbe, Sawyer & Flint, of Sierra City, are driving ahead a tunnel on their ledge, located in Lady's canyon. It is said that 500 lbs of gold have been taken out of the Four Hills mine during the past month or two. This sounds big to persons who do not understand that Sierra county is capable of showing the richest quartz mines in the world. The Hog canyon quartz mine is to be started up soon. There is a mill on the property. Harry Warners owns the Mountain quartz ledge, located east of the Sierra Buttes lode. Harry has expended about \$25,000 in placing the claim in shape to work, and now he is confident that he can show as fine a piece of mining property as there is in the State. Keggleson & Mowry's hydraulic mine at Craycroft Hill has yielded handsomely this season.

MAY BUY THE GOLDEN GATE.—There is very strong talk of organizing a company of Sierra county men to operate at the Golden Gate mine, at Alleghany. The proposed plan is to issue 20,000 shares of stock at \$1 each, \$10,000 would suffice to pay off all lawful claims against the property; \$5,000 would pump out the mine and place things in shape to develop the bonanza that is certain to be found. As no definite action has been taken in the matter yet we can not give any further particulars at present. The successful working of this mine would prove a greater benefit to southern Sierra than any other enterprise that could be inaugurated.

Shasta.

WHISKYTOWN.—*Cor. Shasta Courier*, June 22: The Blair, Saulan & Co. quartz mine is bonded to the Phoenix M. Co. for \$4,000. This mine lies one-fourth of a mile west of the Phoenix and has good returns. B. S. & Co. had to stop work on account of water. Evidently, this is a good mine, but it requires capital to work it.

Trinity.

BULLYCHOOP.—*Trinity Journal*, June 22: Quartz interests in Bullychoop are said to be looking remarkably favorable of late, which reminds us that a promised communication from that district relative to its mines has not yet been received. Henry Burns, our thoroughly practical hydraulic miner, formerly superintendent of the McGillivray mines on Trinity river, is firm in the conviction that the mines of Trinity county promise as well as any on the coast.

NEVADA.

Bullion District.

THE OUTLOOK.—*Cor. Eureka Sentinel*, June 26: The camp does not vary much from other new camps. We have among us two classes of men. One is the prospector and the other is the miner, who wants a job at \$4 a day. Men of this latter sort will have to wait. They are not needed for the present. They will come into requisition after the risk and pioneer work are over, and the road is smoothed out for them. Several of them are lying around the saloons and telling each other the bloody camp has nothing in it. The prospectors on the other hand, are putting in their best ticks, with the prospect of a paying harvest in the future. They are putting ore in sight. They have done enough work to satisfy themselves that there is material here for a big, prosperous camp. Men with a little capital can do well here now, as the boys haven't got up to fancy figures yet. The Limestone Silver Mining Co. have just begun work on their property. They have 10 inches of high grade galena and carbonate ore going straight down into the line. Their progress is being eagerly watched. The formation is favorable for large deposits and the indications first-rate. The Kettle mountain folks are talking of building a wagon road to the Limestone Co.'s mines, in order to get shipments of ore for their new furnaces to run on.

Esmeralda District.

UNDERGOING REPAIRS.—*Esmeralda Herald*, June 22: Wednesday we visited the Silver Hill mill at Gregory flat. The mill is being thoroughly overhauled and repaired by H. Marden, Billy Ball doing the work with the aid of John Vernon, A. Hull and Johnny Booker. Two new pans are being put in and two old ones made as good as new. Five new tanks have taken the place of the old leaky ones, and blind drains cut to carry off what water may ooze out. The engine is receiving an overhauling. An addition has been made to the building for a blacksmith shop. Eugene Godat is excavating on the outside for a slant tank. New belting will take the place of the old, and when all the alterations and improvements are completed, the mill will be equal in every respect to any 10-stamp mill in the State. As near as can be judged at this time, it will be ready to crush about next Thursday or Friday.

Eureka District.

RICHMOND.—*Eureka Sentinel*, June 16: There was considerable flurry on the streets yesterday, occasioned by the report that an important strike had been made in the Richmond mine. Through inquiry from those who are at headquarters and are in a position to know, and who, also, have no disposition to equivocate, we learn that there is "nothing in it." The condition of the mine at present, however, is not discouraging. On the contrary, the outlook is hopeful. Small bodies of ore are being found from time to time that keep the mine up, while the indications are favorable for finding an ore body. Very thorough and important prospect work has been done during the last 12 months, with the confident expectation on the part of the present management of ultimately striking something big on the lower levels.

Safford District.

PURCHASING ORES.—*Safford Express*, June 20: The Onondaga Mining Co. gives notice that it will hereafter purchase all ores on the dumps at Safford which assay \$25 per ton and over. This is encouraging news and demonstrates the low quality of ores that can be worked in this district, especially when it is taken into consideration that these ores have to be shipped to Salt Lake City, a distance of several hundreds of miles and there worked at a profit. This will be a great help to miners in our district who may be in need of money and have not the time or means to ship their rock away.

SHIPPING ORES.—*Eureka Sentinel*, June 16: The Onondaga mine at Safford will commence shipping ore to Salt Lake on Thursday next, a contract having been let yesterday to C. H. Hall, of Beowawe to haul the same from the mine to the railroad. The ore will be taken across the river in a row-boat until the water becomes low enough to allow fording. This is encouraging news for our neighboring district, as we are informed that the mine can furnish steadily 30 tons a day for an indefinite period.

Taylor District.

FINE PROSPECTS.—*Cor. White Pine News*, June 22: Your correspondent visited several of the mines of this district to-day. I was more than pleased at the many fine prospects to be seen in the camp. The first I visited was the Old Brown Bull, owned by Wm. Pryde, Bob Simpson and another partner. The mine is looking well and they are taking out some good ore. They have all the prospects of developing a first-class mine. Hon. A. J. Blair is sinking a shaft, and the indications are that he will soon show up a mine second to none in the district. But little work has been done, though its owners have refused \$16,000 for it. It is owned by John Verzan and two partners, who are at present engaged in the butcher business. There are lots of idle men here, though I believe all the Cherry creek boys are at work.

Tuscarora District.

ELKO CON.—*Times-Review*, June 21: Drift No. 4 has been extended a distance of 15 ft the past week, the last 3 ft being in vein matter on foot wall of west lateral vein. Will discontinue development in this portion of the mine for the present and immediately commence to straighten and timber shaft No. 2 for the purpose of improving our hoisting facilities.

NAVAJO.—Have started an upraise to connect with the 350 level. Other work in and about the mine progressing as usual.

GRAND PRIZE.—West drift on the 700 level is in 334 ft. Joint winze below the 700 level is down 31 ft. The upraise from south crosscut on the 500 level is connected with the 400 level and have commenced stopping from it. The ledge is about a foot wide of fair grade ore. Mill is running on company ore now.

INDEPENDENCE.—The vein shows a width of 3 ft, but no ore. Drift north, 300 level, extended 27 ft; total length, 324 ft. No material change in the formation.

ARGENTA.—West drift from ledge has been extended 16 ft; is in ledge matter giving low assays. Stopes are producing a little ore.

NORTH BELLE ISLE.—Good progress has been made in advancing the drift and upraise on the 300 level. During the next week upraise will connect

with the 150 level. Formation in the drift going south is looking favorable for mineral.

Washoe District.

HALE AND NORCROSS.—*Enterprise*, June 23: The winze below the 2600 level is down about 35 ft. It still shows some good ore on the west side of the bottom. Progress is slow at this point, as much of the air is being used at the winze which is to connect the 2400 and 2600 levels.

SIERRA NEVADA.—On the 3000 level the joint Union Con. west crosscut is out from the joint winze a distance of 46 ft. The face is in a mixture of quartz and porphyry. This material is very hard and breaks out poorly in blasting. How far it may be to the ore vein no one can say; as the distance depends on the dip the ore may have taken below the 2900 level.

MEXICAN.—On the 3100 level the north lateral drift is being advanced as rapidly as possible to connect with the deep winze of the Union Con. and Sierra Nevada, which will presently be sunk to the 3100 level. This connection will be one of great importance, as it will cool and ventilate an immense amount of new and very interesting ground.

OHMR.—Good progress is making in the work of repairing the old Central tunnel. This tunnel starts on Mill street, under the lower railroad bridge, and will come in about 160 ft below the surface at the old Mexican shaft. When repairs are completed the ore now taken out at the surface at the croppings will come out through the tunnel to Mill street. The ladders in the main incline are being repaired.

YELLOW JACKET.—The Sagebrush, second and third level are yielding about the usual quantity of ore. They will soon have the west drift from the fourth level open. At this point it is expected that a good deal of paying ore will be found.

ANDER.—Considerable prospecting is being done and some paying ore is being extracted.

CALIFORNIA.—The south drift on the 2900 level is being advanced as rapidly as possible, as also is the west crosscut on the same level.

NORTH GOULD AND CURRY.—Good progress is made in the sinking. The rock at the bottom of the shaft is vein porphyry, with frequent streaks of quartz and seams of clay.

CROWN POINT.—The upper levels are still yielding a considerable amount of paying ore, with the chance of finding more in the prospecting sections.

White Pine District.

RUNNING.—*Cor. White Pine News*, June 26: The Smoky mill is running finely—everything about it seems in first-class order. They pump back the water from the tailings dump after being used, with a neat little arrangement put up for that purpose. The new pans are doing all that was expected of them. A nice stream of water is running from the new tunnel in Monomoke hill. Two teams, in charge of Alex. Muir, are now hauling ore from the hill. Some very fine ore is being taken from the Safford mine. A narrow streak of very high grade ore is reported to have been struck in the Truckee.

ARIZONA.

NEW SMELTER.—*Silver Belt*, June 16, Mr. Fitch, an experienced smelter, has leased the old New Era mill property, from Mr. Duryea, with the intention of erecting a smelter for the treatment of argentiferous galena ores. There is more than the possibility of success in the scheme, as there is a great quantity of such ores rich in silver, in this district.

PECK DISTRICT.—*Cor. Arizona Miner*, June 22: A party of six, including your correspondent, took a trip to the Black Warrior mine last week. The party was shown through the mine by the genial and accommodating Supt. Mr. Eamans, who spared no efforts to make the visit as enjoyable as possible. Arriving at the mine we found everything hustle and activity. The large pile of ore on the dump was examined and found to be very rich. Then we proceeded to examine the mine. After going through a tunnel 250 ft in length we came to the hoisting works, when we were let down in the bucket to the 50 level, from which place we inspected numerous tunnels and saw great quantities of very rich ore. After wandering about for some time in the bowels of the earth we became desirous of once more seeing the lovely sunshine and beauties of nature on the surface. We were then hoisted up in the same way we were let down, and after passing again through the 250 tunnel we found ourselves once more on the surface of the earth, feeling quite good over our first experience in mining. The hoisting works on the Peck mine will be completed in a few days, when the true development of the mine will be commenced with great energy.

COLORADO.

DUMONT.—*Georgetown Courier*, June 22: Drifting has commenced both east and west on the California lode, in the Lincoln tunnel. The vein shows up finely as the drift progresses. The whole vein, for 20 inches in thickness is being saved. Considerable smelting ore is interspersed through the vein. Quite a number have been soliciting a lease, but the company are too wide-awake for such sharks. This company have expended too much money in running their cross-cut tunnel to intersect with this large and promising vein, to give the cream of it away to every Tom, Dick, or Harry that comes along. The lower level running west now shows a vein of solid smelting ore 20 inches in thickness; mill dirt 25 inches thick. One car load of smelting ore was shipped last week to the public sample works at Black Hawk. The Mansfield mill is being filled up with the mill dirt from the Albino mine. The Lee mine is looking splendidly. Sinking the shaft upon the Milton still progresses.

IDAHO.

PLACERS.—*Idaho World*, June 16. Messrs. Donahue & Murphy are having good success so far this season in their hydraulic placer mining ground above Bear Run, on the Gold Hill side, near Elk creek, just below Mann & Co.'s hydraulic, hill placer mining ground. They are running one hydraulic with a fall of 120 ft, and with about 300 inches of water, and are running night and day shifts, with four hands by day and three at night.

BOULDER CREEK.—M. W. Johnson, General H. R. Caulkins and J. A. Greenlaw, a buyer and operator of mines from Park City, Utah, came to town

this morning. These gentlemen are mine investors and are well-known on the coast, having been connected with some of the larger negotiations made in many mining camps. Mr. Greenlaw is largely interested in Leadville mines and in their management. These gentlemen have been on upper Wood River many days, and examined all the principal mine locations in Warm Spring district. They are negotiating at present for mine property on Boulder creek, with the intention of developing some of the best mines there, and will invest largely in preliminary work.

EAST FORK ITEMS.—Messrs. Abrahams and Fainer, two Colorado and New Mexico prospectors who came to Wood river a couple of weeks ago, concluded to try their luck on the East Fork of Wood river. Last Friday they struck a prospect on the hill adjoining the Ben Butler, Lizzie Lemp, and Elbe Bronide. They called it the Colorado, made a location, and began work. Since then they have made a cut in the ledge, exposed three strata of galena, each four inches wide, and extracted over 1,000 pounds of ore which assays 91 ounces silver and 75 lead to the ton. They are developing their claim.

OREGON.

NOTES.—*Jacksonville Times*, June 2: Bybee & Newman's claim has been shut down for the season. About \$2,000 was cleaned up recently, which shows that the claim is a good one. L. A. Heberle returned from Josephine county Monday, and informed us that the companies working large claims in that section are getting ready to clean up, as water is beginning to fail. Considerable chrome is being taken out right along from the mines in the vicinity of the low divide of Smith river, for the transportation of which to Crescent city teamsters going down from here can earn \$5.50 per ton. C. W. Burrage and Mr. Pomeroy, representing capitalists of Portland, have men at work prospecting some iron deposits in the vicinity of Rock Point. The outlook is promising and we expect that some important developments will be made soon. The mineral resources of southern Oregon are gradually receiving the attention they deserve.

MONTANA.

SUMMIT VALLEY PLACERS.—*Butte Miner*, June 20: In 1864 when the placer diggings of Summit valley were first worked they were considered very rich; and old timers tell interesting stories of the fortunes which were washed out of the ragged looking gulches which abound south of the city. Placer mining at that time may be said to have been in its infancy, and the methods employed were exceedingly crude, the pan and rocker being the plan most in vogue for separating the precious dust from the gravelly soil. It was supposed that when the soil was worked off to the partially decomposed bed-rock the ground was exhausted; which was a fallacy likely to prove of great advantage to the present owners of some of the old placer claims. A *Miner* reporter recently found two men prospecting an old claim south of the city limits, which was supposed to have been worked out years ago. In his presence one of the prospectors scraped an ordinary miners' spade full of decomposed granite from the surface of the bed rock and panned it out of the spade in a pool of water which had settled in the rocks, getting 55 cents in coarse gold from the single spade full. John Noyes is now working his claim, which lies partly within the city limits and just east of lower Main street, with good results. Hydraulic works are employed for which the Noyes ditch supplies 350 inches of water. A larger supply of water might be profitably used, but the head is good, and with the present supply the banks are tumbled into the stream and thence through the 300 ft of sluice box with astonishing rapidity. Mr. Noyes has earned the value of the decomposed granite on the surface of the bedrock, and after the hydraulic works have washed the soil away, nine men are employed in shoveling it into wheelbarrows and wheeling it to the sluices. Two clean-ups have been made this season with very satisfactory results. Hereafter clean-ups will be made every two weeks, and judging by previous results it would not be surprising if the production for the season amounts to \$30,000 or \$40,000.

A NICE CLEAN-UP.—*Inter-Mountain*, June 20: A gentleman by the name of Wing has been operating the Driscoll sluice box on the tailings of the old Centennial mill for the past six or eight weeks, and a few days since cleaned up 700 pounds of quicksilver and 75 pounds of bullion as a result of the run. The bullion proved to be worth \$10 a pound, and estimating the quicksilver at the market rates, the clean-up was worth between \$1,000 and \$1,200 a very good showing. The concentrations are also saved, which will prove an additional source of wealth from the run.

NEW MEXICO.

SMELTER.—*Southwest Sentinel*, June 20: Silver City needs a smelter as much as she needs a fire engine. The earloads of ore and concentrations which leave our depot each day, should be treated right here on the ground. There is money in this, besides, for the right man. Responsible parties who enjoy the confidence of miners, could make advantageous contracts, right now, for sufficient ore to run a smelter six months or even a year. The Benson smelter is a success both financially and practically. The Albuquerque smelting is doing equally well. Both draw their main supply of ore from Grant county, New Mexico, every pound of which would come to Silver City for reduction, if responsible, enterprising men would put up a smelter here. Who will move in the matter? There's money in it. What is supposed to be the Viola ledge has been struck in the Gallatin mine at Pyramid, and an additional force has been put on. The value of the ore already shipped from the Old Man mine at Fleming will not fall far short of \$100,000; and the out put shows no signs of diminution. Fleming continues to be the liveliest camp in the country. Peter Wagner is doing good work on his Atlantic No. 3 claim at Pinos Altos. The main shaft is now down 135 ft, and a whim has been erected for deeper working. The vein at the bottom of this shaft is three ft thick, the body having varied but little in the last 50 ft. The ore assays from \$80 to \$103 in gold, and from 10 to 27 ounces in silver. There are between 200 and 300 tons on the dump. Mr. Wagner has a good property, and has taken the preliminary steps to secure a patent.

Arctic Currents.

(CONTINUED FROM PAGE 434.)

June 7th, steaming from St. Lawrence Bay to St. Lawrence Island in calm weather, (time 20 hours) a current set the vessel thirty miles in an east, northeast direction.

July 2d, steaming from Behring strait to Marcens Bay, (time nineteen hours) the vessel was set to the northeast eighteen miles. There was no wind at the time, but for several days previously a fresh north, northwest gale had been blowing. In passing through the straits near the Diomed Islands at that time a strong current had been encountered which was the subject of remark on board, some estimating it as high as three knots per hour.

From 7 P. M., July 2d, to 4 A. M., July 3d, steaming from Marcens Bay towards St. Michaels, Norton sound, the current set the vessel east, northeast thirty miles.

At 4:30 P. M., July 12th, a short stop was made at Cape Prince of Wales. A northeast current necessitated frequent working of the engine to hold the vessel in position. Wind moderate and variable. July 30th while made fast to the shore ice at the east end of Herald Island, the current was measured with the chip and line and found to be to the northward one knot per hour. There was no apparent change in the velocity or direction of the current during the time the *Corwin* remained at the island, from 9:45, P. M., until 3 A. M. The ice was setting steadily northward during that time.

At Cape Wankarem, latitude 68°-5' longitude 176°-30',

A Tidal Current

Was observed with a rise and fall at that time of about two feet. The flood tide set along the coast to the northward. On the 4th of August while cruising in the strait south of Wrangel Island the meridian observations showed a west, northwest current of twelve miles, but as the position had not been determined by observation for two days previously, it would be impossible to locate the current definitely. However the main fact remains, the vessel had been set twelve miles in a direction away from Behring strait, the wind had been light and variable and could have influenced the current but little.

During the 4th and 5th of August the ship's position was determined by observations and a current found of one knot per hour, setting north, northwest, wind moderate from east to southeast.

On the 10th of August, while at anchor off the south coast of Wrangel Island, near the edge of the ice pack, the current was observed to be setting from one-quarter to one-half a knot, in a northwesterly direction.

August the 11th, when about eight miles off the southeast end of

Wrangel Island,

The current was measured with a chip and line, and found to be about three-quarters of a knot per hour, in a northeasterly direction (the direction of the coast line). During the night the ice continued to drift to the northward. The lead, in which the *Corwin* was at anchor, changed its position to the northward about eight miles. On the following morning, August 12th, while at anchor near the shore, off the east end of Wrangel Island, the current was observed to be setting north one and one-quarter knots per hour. The wind during the 11th and 12th was moderate from west to southwest.

August 13th, the vessel's position was determined by observation and the reckoning brought forward from the position of our landing place on Wrangel Island, showed a north, northeast current of one mile per hour, for the twenty-four hours. At midnight, August 16th, a short stop was made at Point Belcher, and the current was found to be setting to the northward along the coast about one mile per hour. The same current was observed a few hours later, when at anchor near Point Barrow. The wind during that day was light and variable.

August 17th, anchored at

Point Barrow,

Measured the velocity of the current, and found it to be one and three quarters miles per hour, following the direction of the land to the north and east. During our stay at Point Barrow the wind was light and principally from the eastward, so that it would have but little effect on the current.

August 18th, got underway from Point Barrow and steamed to the southward with a strong head current; wind fresh southwest, which, no doubt, accelerated the current.

At 7 A. M. the following day, at Point Belcher, found the current setting to the north-east along the land, but very much decreased in velocity; the wind was light southerly.

From meridian, August 19th, to meridian, August 20th, while steaming to the southward between Ice Cape and Point Hope, the vessel was set to the northward along the land thirty miles. From 5 P. M., August 20th, until meridian of the 21st, the current was found to have set twelve miles north by east, one-half east. From 4 A. M., August 22d, to meridian, August 24th, in Behring strait and sea between the Diomed Islands and Plover Bay, the current set seventy-five miles to the northward; the wind blowing a fresh gale from the south and southeast. Some days later in returning over this track, with a moderate wind, no current was encountered.

In September, the result of our observations in Kotzebue sound showed a tidal current with

a rise and fall of about three feet. The great Currents of the Arctic Ocean,

So far as known, may be briefly described as follows:

First—An easterly current through the cluster of islands lying to the northward of the American continent. This current is best shown by the drift of the English exploring vessel, the *Resolute*. After being abandoned by her people in Melville sound she drifted with the current through Barrow strait, Lancaster sound and Baffin's bay into Davis strait; a distance of about 1,200 miles.

Second—A southerly current between Grinnell land and the west coast of Greenland. This current has been often remarked by navigators, but is best shown by the drift of the *Polaris* while beset in Smith's sound, and also by the remarkable drift of a part of her crew on the ice floe through Smith's sound and Kennedy channel to the coast of Labrador.

Third—A southerly current between the east coast of Greenland and Spitzbergen. The strong southerly set met by Parry in those seas in his attempt to get north from Spitzbergen by means of boat and sled, and his heroic but unavailing efforts to overcome this obstacle by which Nature guarded that route to the pole, need not be recounted here.

Fourth—Still farther to the eastward, between Spitzbergen and the coast of Norway, a branch of the Atlantic Equatorial current, so much modified both in temperature and velocity as to be almost unrecognizable passes to the northward and loses itself in the icy regions.

Fifth—And last, the current through Behring strait and that part of the Arctic ocean lying to the northward. The existence of this current has been doubted by the Hon. Clements Markham, in a paper read before the Royal Geographical Society of London, and indeed by some of our own countrymen. They quote in support of their belief the incidental mention of the reports from the relief vessel *Rodgers*, which was burned while at anchor at St. Lawrence bay. The reports from her are said to show no northerly current in the vicinity of Wrangel Island, but a regular tidal current with a rise and fall of five feet. They quote, however, at the same time, the words of the New York *Herald* correspondent with the *Rodgers*; the latter says: "It was surprising to see the ice moving constantly to the westward along the shore." This is not only inconsistent with the theory that the *Rodgers* found no current other than a tidal one, but it agrees with the result of the *Corwin's* observations in that vicinity. From one-quarter to one half knot westerly current on the south side of Wrangel Island, and a northerly current along the east coast of the island. A glance at the chart will show the impossibility of a northerly current through Behring strait having any other than the direction indicated along the south and east coasts of that island, if unobstructed by ice. As already stated, however, all currents are subject to change in the vicinity of the ice pack.

One Theory Advanced

In relation to the Behring strait current is that it is caused by the rivers emptying into Behring sea and Norton sound. The effect of the rivers in Kotzebue sound was remarked by Capt. Beechey, R. N., who in speaking of a current encountered between Point Hope and Kotzebue sound, says: "It varied from one and a half to three miles per hour, and was strongest in shore; it was very constant, and the water was much fresher than the ordinary sea water." He adds, it is necessary here to give some further particulars of this current, in order that it may not be supposed that the whole body of water between the two continents was setting into the Polar sea at so considerable a rate. By sinking the patent log first five fathoms and then three fathoms, and allowing it to remain in the first instance six hours and in the latter twelve hours, it was clearly ascertained that there was no current at either of those depths; but at the distance of nine feet from the surface the motion of the water was nearly equal to that at the top. Hence we must conclude that the current was superficial and confined to a depth of between nine and twelve feet. By the freshness of the water alongside Captain Beechey believed that the current was occasioned by

The Many Rivers

which at this time of the year empty themselves into the sea at different parts of the coast, beginning at Schischmareff inlet. He further says, so far there is nothing extraordinary in the fact. But why this body of water should continually press to the northward in preference to taking any other direction, or gradually expending itself in the sea is a question of considerable interest.

The remark applies with equal force to such rivers in Kotzebue sound, as pass through Behring strait, while the decreased specific gravity of this river water due to its higher temperature and freedom from salt, would prevent its readily mingling with the surrounding salt water. The fact of its flowing northward through Behring strait, notwithstanding the course of the current is broken by shoals, sand bars, capes, islands, etc., is not so readily explained except upon the theory of the surrounding current having the same direction.

In proof of the existence of this current we have first the

Remarkable Drift of the "Jeannette."

This vessel entered the ice near where the observations of the *Rodgers* are said to have ap-

peared all existing theories in relation to Arctic currents; and notwithstanding the enormous friction of the ice, at points of contact, to be overcome, and in the face of adverse winds which many times set her back to the south and eastward. In twenty months, as a result of all currents, she had made 500 miles in a northwesterly direction. Unlike the drift of the *Resolute* through Barrow strait and Lancaster sound, or the *Polaris* party in Smith's sound and Baffin's bay, the *Jeannette* drifted in the open sea, where she was subject, in a much greater degree to the varying influence of the wind, and where the strength of the current would naturally be less than if confined within the narrow limits of a strait or sound. In view of these facts it is believed that this drift furnishes proof of the existence of a northerly current which has its origin south of Behring strait, in comparison with which all observations yet made sink into insignificance.

Then we have the

Formation of Shoals

On the north side of all points on the American continent, from Behring strait to Point Barrow. Beginning at Cape Prince of Wales we find that, although the water to the southward shoals gradually to the shore, the detached shoal lies entirely to the northward of the cape. At Point Hope we find the detached shoal with four and one-half fathoms of water on it entirely to the northward with twelve fathoms of water inside within two cables' length of the point. The same is true of Cape Lishourne, a shoal with five fathoms of water, lies wholly to the northward of the cape. The Blossom shoals off Ice Cape appear to be due to other causes than the current, possibly some peculiarity of the bottom. This, however, is a mere surmise, and is made upon the ground that they differ greatly from other shoals found along the coast, which are subject to nearly the same conditions of ice and current. Although lying to the northward of Ice Cape, they differ in the fact that instead of one, there are several of them, lying parallel with the shore and having deep water between them.

At Point Barrow the detached shoal lies entirely to the northward, although shoal water exists along the shore, to the southward.

The Drift of the Behring Sea Ice,

Through the strait into the Arctic ocean, each year, and the fact that the southern limit of the Arctic pack retreats to the northward with well closed edges, during the summer, until brought south again by the fall gales, cannot but be regarded as another evidence of the northerly direction of the current.

The fact that of all the whale ships lost north of Behring strait, but one has been found south of where wrecked; the discovery, near Herald Island, of part of a vessel burned south of Behring strait, must also be regarded as evidence pointing in the same direction. We have also the testimony of whalers, the only men who navigate these seas regularly, not one of whom, so far as I can learn, doubts the existence of this current. Then comes the testimony of the natives living on the shores of Behring strait, to the same effect. But in all this evidence, there is nothing inconsistent with a regular tidal current in Behring strait.

In a paper read before the Geographical Society of the Pacific soon after my return from the Arctic ocean in 1881, I stated my belief in a tidal current in Behring sea and the Arctic ocean, and also that a branch of the Kiro Siwa, or

Japanese Warm Stream

(so called), passes through Behring strait, hot, however, subject to the ever-varying conditions of wind and ice; and in applying this name to the origin of the current which, I believe, passes through Behring strait, I referred not to the small stream separated from the main body of the equatorial current by the Japan Islands, and which flows northward as a separate stream only so long as it is separated by these islands, but to the western edge of the great equatorial current which makes the circuit of the North Pacific, and to which the name of the smaller stream has been applied. The impossibility of this small stream maintaining a separate existence from the Japan Islands to Behring strait, with anything like a uniform velocity and temperature and clearly defined edges, must be plainly apparent when we consider the facts.

The Effects of Wind

Upon the surface currents of the ocean are too well understood to require discussion at this time. To the winds are due the equatorial currents of both oceans, while ocean currents night and would occur if not influenced by winds. In the constant efforts which are made by the sea to maintain its equilibrium in spite of disturbances due to difference of temperature and the consequent difference in evaporation, these currents would necessarily be slight and nearly in the direction of the meridian owing to the positions of the disturbing elements, heat and cold, and not at right angles to the meridian as is the case with the equatorial currents of both Atlantic and Pacific oceans. These are caused by the trade winds, and run in a westerly direction, until turned in the direction of the meridian by contact with the eastern coast of the great continents.

In the case of the Atlantic currents, the new direction is to the northward, owing to the direction of the coast line upon which it impinges, while the Pacific current is divided, one portion flowing to the southward. But it is the northern branch which is now under consideration, a small portion of which, I believe,

passes through Behring strait, but in a modified form, both as to velocity and temperature.

Referring again to the causes of the difference in the

Specific Gravity in Sea Water

In different parts of the ocean, the temperature and percentage of salt, we find that the former decreases and the latter increases it, and as in case of two strata of different density coming in contact, the stratum having the greatest specific gravity would, in obedience to the laws of gravitation, sink below the other, it will be seen that an equatorial current can exist as a surface current only so long as its temperature is sufficiently high to render it lighter than the adjoining stratum. As it comes in contact with the colder waters in its passage, its temperature becomes lower and it sinks below the waters of the higher latitudes, which, on account of decreased evaporation and the large amount of fresh water discharged into it from streams of melted snow and ice, contains much less salt, after which it may continue its course as a warm under current until neutralized by the surrounding water; or, as in the case of a shallow body of water, like Behring sea, the result of a contact between two currents of different temperatures must be the creation of a single current by the mingling of the two, whose direction will be that of the stronger of the originals, and whose velocity, temperature and specific gravity will be their mean.

A Branch of the "Kiro Siwa"

Extending to Behring strait would thus be very much modified in all respects, in fact, its temperature could be but little above the normal temperature for that latitude, consequently the comparatively low temperature of the waters of Behring strait is not inconsistent with that theory, as has been claimed, neither has anything yet been made known which in any way conflicts with the belief so long held by navigators in a northerly current through Behring strait, which has its origin in the equatorial current of the Pacific.

In my opinion the mistake lies in applying to this current the name of "Japanese warm stream." The name suggests an erroneous idea,

Death Valley Borax Mines.

The Eagle borax works are situated in Death valley, near Bennett's wells. The Inyo *Independent* says the plant consists of 320 acres of borate lands, situated about twenty-two miles south of the Coleman works, and ninety miles from Daggett station, on the P. I. branch of the S. P. R. R., hence all the freight goes that way. At the works the raw material is boiled in tanks twenty feet long, three feet wide and two deep, and is afterwards cooled and crystallized in twelve galvanized iron tanks. The production of refined borax so far amounted to twenty-two tons per month. Mesquite wood from the borders of the valley, and nut pine from the Panamint range furnish plenty of fuel; and good water abounds, surrounded by about twenty acres of meadow land. The first shipment of thirty-seven tons of crude material realized eight cents per pound, the article being of unusual purity, and, according to Prof. Price, about equal to the best refined article.—*San Bernardino Index*.

AN ADVERSE VIEW.—Wm. B. Owens writes to the *Sierra Tribune* from Harrisburg, Alaska, on date of May 1st and says: "There is no money in the place. Traders use leather checks to trade with. People are coming here on every ship by the hundreds, and a majority of them have no money to get away on. There is no chance here to work for wages, for there are no mines to work. A man cannot walk one mile on account of the underbrush and moss being so thick. The only way a man can get around is in a canoe. There is no gravel around here, and the quartz does not amount to much. There is some quartz on Douglas Island which prospected very rich on top, but gave out a couple of feet from the surface. Tell the citizens of Sierra county not to come to this country at present, for there is nothing here. Something might be developed in the interior after a while; but that will not be for some time yet, as it costs too much now to get out through the country. It costs ten cents a pound to get stuff over the portage after it leaves the canoes. It is packed on the backs of Indians. The Yukon river, which is about two thousand miles long, is the place I speak of when I say the interior. No one knows anything about the river so far as gold is concerned. Harrisburg is on the lower edge of Alaska. The weather here is fine. We have a little rain daily. The days' length at this writing is about twenty hours."

THE MALAYAN CANAL.—The Survey Commission for the cutting of the Isthmus of Kra has returned to France. It has been six months on the Malay Peninsula. Lieutenant Belton, in charge of the survey, declares that the cutting of a maritime canal on the level through the isthmus will present insignificant obstacles. The isthmus is an uninterrupted forest of the most valuable timber. The lower stratum of the ground is granitic; the upper almost everywhere is soft sandstone. The length of the canal is 111 kilometers, fifty of which have to be cut. For the rest of the distance the river will be utilized.

THE San Francisco and Pacific Stock Exchange have resolved to adjourn from the close of business on Saturday, June 30th, to Thursday morning, July 5th—over the Fourth of July.

THE ENGINEER.

Progressive Designs Upon the Holy Land.

China and Japan, after the lapse of centuries, were at last compelled to open their ports to foreign trade and to adopt many of the improvements of higher civilizations. And now it is proposed that the Holy Land shall be aroused from its lethargy to experience a thrill of the progress which has lifted the surrounding nations into commercial prosperity and political greatness. An English company, with the Duke of Marlborough at its head, has been formed to make the preliminary surveys to find out whether it will be practicable to carry out several suggested enterprises. The first contemplates a canal twenty-five miles in length from Haifa, on the bay of Acre, through the plain of Asdrachon to the valley of the Jordan, to be 200 feet wide, which would conduct the waters of the Mediterranean into the heart of Palestine. It is further proposed to build a canal twenty miles in length from the head of the gulf of Akabah to the Dead sea. The *London Railway News* says: "If these plans are carried out it is expected that an inland sea, about 200 miles long, varying in width from three to ten miles, and deep enough to float vessels of the largest size, would extend from the Mediterranean to the Red sea." Supposing it possible to overcome all the engineering difficulties in the prosecution of these grand works the consent of the Porte will be necessary before they are undertaken; and it is feared that certain European Powers would offer objection to any privileges of an exclusive character being granted to England. The *London Times* refers to the proposed enterprise as follows:

It is possible the new enterprise may be proved to the satisfaction of many devout men and women to be the fulfilment of the prophecy of Ezekiel, to the effect that there is to be a broad sea in the desert, and that "the fishes shall stand upon it from Engedi even unto Engedi."

A WIRE TRAMWAY ROAD FOR PASSENGERS.—Some enterprising men of Colorado have conceived the idea of building an "elevated" tramway to the summit of Pike's Peak for the transportation of those who desire to experience the solitude of that high. The altitude of the mountain above the sea is 14,200 feet, and the length of the road in making the ascent will be about nine miles. It is proposed to build the line in three divisions, each operated by a different motive power. The tramway is to be an endless wire cable carried on substantial supports at a height of about twenty-four feet above the ground. Attached to the cable at intervals of about 100 feet there are to be large arm chairs, each capable of holding two persons. The first division will be from the iron springs at Manitou, and the cable will be moved by a steam engine at the lower terminus. The cable of the second division, higher up the mountain, will be moved by power from a turbine wheel, driven by the water from one of the cascades on the mountain. On the third and upper division the cable will be operated by a steam engine located at the signal station on the summit. Platforms are to be constructed at the ends of each division, so that passengers may safely and quickly change cars. It is expected to complete the line by August 1st. The proposed fare, it is said, will be \$5 for the round trip. The plan seems feasible enough so far as the construction of the line is concerned, but the working of the boiler and engine at that altitude is a matter of experiment, and as all the fuel will have to be transported over the line for the summit engine, it remains to be seen how much surplus steam there will be on hand after drawing up the coal.

WATER GAS FOR STEAMSHIPS.—A test is about to be made in Great Britain in connection with the use of water-gas as a fuel for steamships. It is reported that the Mauritius Steamship Line has built a steamship called the *Heron*, of 1000 tons burden and provided it with the necessary apparatus for the purpose in question. The *Heron* is to ply between London and the islands of Mauritius and Madagascar, and it was expected that she would start on her trial trip about the middle of this month. She has been fitted out with six furnaces, and great expectations are entertained as to her saving in fuel. It is also rumored that another English steamship company has placed sufficient confidence in the project to begin the construction of a vessel without coal bunkers.

MARKET STREET CABLE ROAD.—On the 15th inst. the cable on the Valencia street extension of the Market street railroad was laid. It took eighteen horses to pull the cable through to the terminus beyond Twenty-sixth street, and to haul the great wire rope around the drum there and back to the engine house at Valencia and Market streets it required twenty-two horses. The cable is four and one-quarter miles long. The first car for this cable road left the Central Pacific railroad shop at Sacramento on Thursday of last week. Thirty-six have been ordered, a dummy and coach in one piece, and two four wheeled trucks instead of the usual four-wheels with dead axles.

USEFUL INFORMATION.

HOW TO KEEP CUT FLOWERS.—A reporter found his way into a florist's and feasted his eyes and nose on the beautiful buds that lay in bouquets there. "How long will this clove pink last?" he inquired. "Oh, with care, a week or ten days. A solid rosebud will last about the same time. There's a good deal in knowing how to keep flowers fresh." "Do you use any preparations—any salt in the water, or ammonia, or the like?" "Not at all. That's all nonsense. All that is necessary to keep flowers fresh is to keep them moist and cool. If people, instead of dipping flowers in water or putting them in a vase with water, would simply wrap them up in a wet newspaper, they would find that they would keep far fresher over night. A wet towel or napkin would be too heavy and crush the blooms too much, and besides, it would allow the moisture to evaporate too easily." *Cleveland, Ohio, Herald.* On the above, the *Scientific American* says: Flowers can be preserved in their natural form and color. Insert the stems in water, in which twenty-five grains ammonium chloride (sal ammoniac) have been dissolved. Flowers can be preserved in this way for fifteen to thirty days. To preserve them permanently for several months, dip them into perfectly limpid gum water, and then allow them to drain. The gum forms a complete coating on the stems and petals, and preserves their shape and color long after they have become dry.

A PICTURE IN THE HEART OF AN OAK.—A correspondent of the *Waterbury, (Conn.) American*, writing from Watertown, says that Mr. Benjamin Marvin, of that town, in splitting a log of black oak, observed a picture on the smooth grain in the heart of the tree. It is a landscape, or rather a clump of trees, with trunk and branches and twigs as clearly defined as though drawn with ink or photographed by the sun's rays. The trees form a picture about four inches square, showing like the open leaf of a book, and the same on the opposite page. Mr. Marvin says it is a pretty good portrait of the clump of trees which he felled, the picture appearing in the heart of the largest one. Such pictures are sometimes said to be a result of lightning flashes, but they are more commonly the result of the arborescent crystallization of manganese. They are quite common on the cleavage faces of different rocks. The so-called pictured rocks are produced in a similar manner.

A NEW METHOD OF MANUFACTURING BELTS or bands for machinery, which comes from Paris, is applicable to rubber, woven tissues of gutta-percha, and consists in making the belt in longitudinal ribs or grooves, the main object of which is to increase the capacity of the belt on the same cross section, say twelve inches, by the extra strength put in the same space, and also to prevent so much stretching and variation. Another modification of the same invention, is grooving one side of the belt the same as saw teeth, then putting these two pieces together, leaving a plain bearing surface for contact besides, thus making a double belt, which is less liable to stretch or to warp. Especial machinery is built for the purpose, and the claim for it is that better contact is given. The pores are closed during this grooving process, the belts having a higher resisting power, and do not twist on the pulleys. The grooves may be regular, irregular, spiral, or crossed.

AN ELASTIC LACQUER.—A lacquer, said to be of great elasticity, perfectly supple and not liable to peel off, is made in the following manner: About 120 pounds of oil varnish is heated in one vessel, and 33 pounds of quicklime is put into 22 pounds of water in another. As soon as the lime causes an effervescence, 55 pounds of melted Indian rubber are added. This mixture is stirred and then poured into the vessel of hot varnish. The whole is then stirred so as to be thoroughly mixed, then strained and allowed to cool, when it has the appearance of lead. When required for use, it is thinned with the necessary quantity of varnish and applied with a brush, hot or cold, preferably the former. This lacquer is useful for wood or iron or for walls; it will also render waterproof, cloth, paper, etc.

JOINING RUBBER BELTS.—There are a great many plans for joining the ends of rubber belts. Some use rivets, others hooks, but lacing is considered best. The manner of lacing is of considerable importance, as the strength of the belt is only equal to the strength of its weakest part, hence the most economical manner of joining the ends is that one which will make the strength of the joint equal to the average strength of the belt. India rubber is a good substance for belts that are exposed to the weather, as it does not absorb moisture. Belts should not be subjected to a strain of over three pounds to the square inch of section, and beyond a certain point tightness has but little effect.

HORN MAY BE WELDED or joined by heating the edges until they are quite soft and pressing them together until they are cold. It may be softened, after sawing it into plates or sheets, by exposing it to powerful pressure between hot iron plates. Before pressing, the pitch must be removed, and the horn softened, first by soaking for some days and then boiling in water.

GREASY COLOR.—The painter is frequently annoyed by having his paint or varnish crawl, or draw up, leaving bare spots, when applying it over a painted surface. The cause is what is known as "greasy color" that is, if the paint was not mixed with oil it is a greasy pigment, such as lamp-black, but the most common trouble is too much oil. To overcome the difficulty wash the surface, or simply rub a damp sponge over it; or, if it be only a small spot that appears "greasy," blow the breath upon it, and the crawling will be overcome. *Painter's May Time.*

PRESSURE WILL NOT PREVENT FREEZING.—Water will freeze, however closely confined, if the proper temperature is present. If powder or dynamite is confined in a chamber, that is strong enough to prevent bursting, it will not prevent the chemical combination, when brought to the proper condition for explosion, whether by heat or otherwise. The pressure will last until reduced by cooling, new combinations, or waste. These experiments have been made by firing a confined charge and allowing it to waste through a small vent.

A PERSON AGED AT EIGHTEEN.—There is in Schuylers county, Mo., a young old man, who, without apparent cause, living plainly on a farm, has in eighteen years passed through the physical changes of fourscore. At the age of six he had all the development of strength and muscle usually in a lad of fifteen. At twelve his beard was grown and gray hairs appeared. Now, at eighteen, he is as decrepit as any old man of eighty, and seems tottering on the verge of the grave.

M. POMPIER, a French aeronaut, has made two ascents with elongated balloons, carrying four people. Both were successful. In his second he obtained a movement of the balloon in the required direction by the action of his rudder independent of the wind, which appears to be the first time any aeronaut has done so.

PREPARING SMOKED MEAT.—When meat is exposed directly to a thick smoke of a fire of any kind, the lamp black will accumulate on it, giving it an unsightly and unsavory appearance. Put the meat in sacks made of thin cloth, which will admit the creosote and keep off the coarse smoke.

The *Journal de Pharmacie* says that a nuclide composed as follows will unite wood, porcelain, or glass: Eight and a half ounces of gum arabic in strong solution, twenty grains of solution of alumina dissolved in two-thirds of an ounce of water.

GOOD HEALTH.

Natural Cure for Consumption.

We have before us a valuable little treatise, the title page of which reads as follows: "Natural Cure of Consumption, Constipation, Bright's Disease, Neuralgia, Rheumatism, Colds, Fevers, etc.—The Origin, Prevention, and Removal of Disease. A Manual of Hygiene for well and sick. By C. E. Page, etc., author of 'How to Feed the Baby,' etc. Two hundred and seventy-eight pages, 12mo., extra cloth. Price \$1.00. New York: Fowler & Wells, Publishers, 753 Broadway."

From a careful review of this work, it would seem that we have, at last, a health book, written by one who has devoted his life to the study of the prevention, as well as cure, of sickness, through a rational interpretation of natural laws. "Is consumption curable?" is a question which—outside of nostrum venders and charlatans, who have no scruples against lying for gain—has long since been answered in the negative. There is a conviction to this effect, in the minds of the people. The local doctor, of whatever school or skill, is no more expected to cure consumption, than to extend the average age of man to a round century. Indeed, if the patient recovers, it is declared throughout the community that the disease was not consumption after all, for, "if it had been, he would never have recovered!" While endorsing this position as regards patients who shut themselves up at home and submit to medication, Dr. Page shows, by reference to the records of the dissecting-room, that partially consumed lungs do often heal, and that many persons who have never, perhaps suspected the presence of the disease, have lived for many years with less than an entire pair of lungs. Even after one-half of a lung has been destroyed, a perfect cicatrization of the tuberculous ulcers has taken place, and there has continued to be performed all the essential functions of the sound organ. "But," says our author, quoting Dr. Oswald, "in ninety-nine out of a hundred cases it will be found that the first improvement followed (not upon a change of 'doctors,' nor the swallowing of an irregular nostrum, but) upon a change from a sedentary to an out-door and active mode of life." He affirms the position that, given anything like natural conditions, such as it is the aim of this book to prescribe, "pulmonary consumption in its earliest stages is, perhaps, the most curable of all chronic diseases." A most remarkable case of self-cure, that of a young and determined girl, whose disease had passed to the "last stage," is given, and vouched for as an actual fact. The work is designed to illustrate the "food and fresh air cure" for

"dyspeptic starvation," which is Dr. Page's definition of the disease under consideration.

With relation to the dreaded Bright's disease, while agreeing with the most eminent physicians of all schools that this is a disease resulting from excessive or ill-conditioned diet, still, unlike almost all practitioners, Dr. Page holds that this, too, is a disorder which is readily amenable to "natural treatment." The consideration of the other diseases named is somewhat unique in character, and the author maintains that a strictly natural regimen is not only preventive, but curative of all disorders, so long as a restoration to health is possible, and this, too, at stages subsequent to what are, in general practice, held to be incurable. The book relates mainly to a disease whose treatment, judged by the mortality reports, has been radically wrong; and, as a whole, will repay a careful perusal, even by those who feel obliged to dissent from some of its conclusions. It is designed not only for popular reading, but as a text-book for physicians of all schools, the most intelligent of whom are coming more and more to realize the importance of hygiene as an aid to, if not as the principal treatment of, all disorders.

BATHING ABUSED.—Doctor Sargent, medical director of the Christian Union gymnasium, Boston, astonished a lecture audience, by the assertion that there can be abuse in bathing. Our cities are full, he said, of thoughtless persons, who pride themselves upon being superior creatures, because they indulge in the luxury of a full bath daily, with a frequent Turkish or Russian ablution as an extra—a kind of bath which the doctor thinks should only be taken under advice for disease. He explains that free perspiration and the wearing of heavy flannels, promote the functions of the skin, so that only an amount of bathing essential to cleanliness, is needed to maintain health. Warm baths are the substitutes which luxury has devised to do the work of exercise and make up for the deficiencies of artificial life. Twice a week is often enough to take them, according to the lecturer, as their too frequent use is debilitating. The tonic effect of a cool sponge bath in the morning, would not willingly be given up by those who know the delightful after-glow and the protection which the habit affords against colds; but here again a discriminating science, lacking up common sense, steps in and says: "No cold bath, unless they are agreeable and you are, in point of health and vigor, fully up to it." The intelligent person who learns to "know his frame," and to observe the effect of diet, bath and exercise, can usually order his life better than anybody can direct it for him.

HEALTHFUL EXERCISE.—Walking, of itself, says Dr. Sargent, of Harvard College, is of no value as an exercise, but a spirited walk is one of the finest of all exercises. If a man enters heartily into this exercise he will be benefited by it. Horseback riding is an excellent exercise for circulation, as very little of the nervous energy is expended. For a person who uses the mind excessively, however, this form of exercise is not good, as it produces nervousness. Swimming is, without exception, one of the finest of all physical exercises. It develops especially the lower portion of the chest, the legs and arms. Running, at a regular and fixed pace; boxing, to teach one to keep the temper under adverse circumstances; rowing and canoeing, to strengthen the upper part of the thorax and chest, are useful. The benefit to be derived from regular practice in a gymnasium, by which the mind and nerve-centers are so trained that they have a certain amount of control over the body, so that while the muscles may give out, this mental power, when once obtained by physical training, will never be lost, is of the greatest account.

ACONITE IN DYSENTERY.—The *New York Medical Journal* publishes an account of the treatment of 150 cases of acute dysentery by a Dr. Owen, who employed only a very weak solution of aconite, of which he administered about one drop an hour. This treatment was substituted for the regulation treatment with ipecac. The doctor commends the treatment very highly, and says that patients like it very much better than the nauseating doses of ipecac. We have no doubt that Dr. Owen's method is an improvement over the old one, but we have successfully treated fully as large a number of cases without either aconite or ipecac, employing chiefly the hot enema, with sufficient satisfaction to the patients to lead them to declare that they would afterward employ no other treatment in the event of a similar attack.

NITRATE OF SILVER AS A MEDICINE.—When nitrate of silver is used as a medicine for a length of time, the skin becomes of a peculiar bluish or slate color. Many may remember the familiar face of the blue man who formerly lived in this city, and whose face had assumed this singular hue. There is also a "blue man of Missouri" whose skin is discolored in the same manner and from the same cause. When about 15 he took five drops of a solution of nitrate of silver, containing 20 grains to the ounce, and continued this for five or six months. At the end of that time he observed that his face and hands were becoming dark. This color has become permanent, and hence his sobriquet. Nitrate of silver is sometimes used as a remedy in epilepsy.



A. T. DEWEY W. B. EWER.

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A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, June 23, 1883.

TABLE OF CONTENTS.

EDITORIALS.—Prospecting in Alaska; Surface Mines at Harrisburg, Alaska, 442. Limiting the Sea Otter; The Signing of the Declaration of Independence, 447. The Peerless Traction Engine; A Submarine Monitor; An Early Celebration; The Broken Dam, 448. Beach Diggings; Galvanic Treatment of Silver and Copper Ores; Mining Expedition to Alaska; The Outlook, 438. Passing Events; Close of the Volume; Our National Day; Map of Alaska; Mining Machinery; Immigration; Alaska Scenes, 440.

ILLUSTRATIONS.—Working Beach Diggings in New Zealand; Becker Glasses for Treating Copper and Silver Ores, 443. Scenes in Alaska—Harbors and Rivers of the Northwest Coast of Alaska, 441. The Signing of the Declaration of Independence; Sea Otter Hunting on the Pacific—The Alaska Islander's Canoe or Biadarka, 447. Herald Island in the Arctic; The Cow in a Nip off Cape Romanoff, 443. The Peerless Traction Engine or Road Locomotive, 448.

CORRESPONDENCE.—English Investments in Pacific Coast Mines, No. 6, 434.

MECHANICAL PROGRESS.—Damascus Steel; Why Iron Chills; Phosphorized Nickel; Metallization of Timber; Hollow Brick Walls, 435.

SCIENTIFIC PROGRESS.—Labor and Food; The Value of Metals; Philosophy of Quieting the Waves with Oil; Nature in Siberia; Observations on Sound; Permanent Lamp Attachment; Iron and Steel Magnetized by Breaking, 435.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends and Bullion Shipments, 436.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Idaho, Montana, New Mexico, Oregon and Utah, 436-7.

THE ENGINEER.—Progressive Designs Upon the Holy Land; A Wire Tramway Road for Passengers; Water Gas for Steamships; Market Street Cable Road, 439.

USEFUL INFORMATION.—How to Keep Cut Flowers; A Picture in the Heart of an Oak; An Elastic Lacquer; Joining Rubber Belts; Greasy Color; Pressure Will not Prevent Freezing; A Person Aged at Eighteen; Preparing Smoked Meat, 439.

GOOD HEALTH.—Natural Cure for Consumption; Bathing Abused; Healthful Exercise; Aconite in Dysentery; Nitrate of Silver as a Medicine, 439.

NEWS IN BRIEF.—On page 452 and other pages.

MISCELLANEOUS.—Arctic Currents, 434. Death Valley Borax Mines, 438. Alaska Mines; Scenery of the Northwestern Archipelago, 442. Change in Railway Trains; Note for Millmen, 447. Alaska, 444. To Yulter City, Maricopa County, A. T., 443. Alaska Bears, 443.

BUSINESS ANNOUNCEMENTS.

U. S. Submarine Monitor Co.—W. H. Milliken, S. F. Dividend Notice—San Francisco Savings Union. Dividend Notice—German Savings and Loan Society. Practical Metallurgist—G. H. Aaron, Pinal, Arizona.

Passing Events.

This week we devote our space largely to consideration of Alaskan affairs, and have obtained a great deal of information about this region which will be useful to miners and prospectors.

The approaching national holiday has already occasioned the usual temporary business lull, many taking the opportunity to have a short vacation. The customary festivities will take place in this and other cities on the coast.

It is noticeable that there are a number of custom mills and reduction works going up in various camps, where miners may have ore worked. Establishments are being fitted up, also, where ores may be sold. The increase of such facilities argues well for the future of mining on the coast.

Several new strikes are recorded in our "Mining Summary." The beginning of work with nickel ores, elsewhere alluded to, is an important thing. No doubt the starting up of a few mines will encourage prospectors to search for this valuable metal. There are doubtless plenty of other deposits than those mentioned.

Close of the Volume.

This number is the last one of Vol. XLVI of the MINING AND SCIENTIFIC PRESS. The voluminous index on the last page shows what a range of subjects has been treated during the past six months, and how great a variety of reading matter has been given. We have kept track of all new discoveries in science and mechanics, as well as in mining and metallurgy. The mining community has been able by our columns to keep pace with all improvements, by seeing what was being done in their branch in all parts of the world.

The MINING AND SCIENTIFIC PRESS is the oldest mining paper on the coast, and its experience in the field has enabled it to present such material as will be of use to the prospectors, miners, metallurgists and mining engineers in their business. We have taken trouble to describe in detail all new processes, machines, etc., that have come to the front. All the current news is given weekly in a condensed form so that people may keep posted as to what is going on in various districts. The newly patented inventions worthy of note have been described intelligently, and close watch kept of the decisions of the courts and departments affecting the mining interests.

We have published several double editions, and propose issuing others from time to time, devoting considerable space to certain localities. The PRESS is one of the factors of mining progress on this coast, and is a journal mining communities cannot well dispense with. While its advertising patronage and subscription lists are now well advanced, the better support we have the better journal we can issue. We have several improvements now in view, and need the co-operation of all interested in the mining industry. It is well to add that the beginning of a volume is a good time to send in names for subscription and to renew. Those who know the merits of the PRESS will oblige the editors and publishers by calling the attention of others to the paper.

Our National Day.

It is one of the noblest endowments of our nature, that while standing on this fleeting point of time we can look both ways. By memory and history we may in some degree recall the past, and by hope and imagination anticipate the future. We are now concerned with only one great event in the past. Next Wednesday is the natal day of our Republic. There are days that come to us all fraught with such special remembrance, that it seems to be a duty to put ourselves into an attitude to breathe what is healthful in the passing air. We are such slaves of association that we can most easily think and feel the stir and thrill of great ideas in our country's history, upon the day that comes most fragrant with national memories. And yet it is not possible in a brief article to lift the veil of Time and tell the old story, how two millions of people moved by one patriotic impulse, forsook the plow, shop, counter, and home, to follow the fortunes of their new-made flag over many a bloody field, till victory crowned their efforts at Yorktown. But we shall find the spirit that animated them embodied in the events that immediately led to the declaration of independence. Let us watch the process of a nation's birth!

The movement for independence was not any sudden explosion of heated passion, nor was it the work of any one man or set of men. For months it had been talked over as a "consummation devoutly to be wished," by the mechanic in his shop, the fisherman along the northern coast, the planter in the sunny south, and the pioneers and hunters of the west. It had been warily discussed in town meetings, social parties, in the pulpit, newspapers, by the Committee of Safety, and the Provincial Legislatures. The members of the Colonial Congress were no company of reckless adventurers, who had everything to expect and nothing to lose by a revolution. They were slow, cautious men, who long hesitated and were silently borne on the current of events. June 7, 1776, Richard Henry Lee, in the name and by the special authority of Virginia, proposed this resolution: "That the United Colonies are and of right ought to be free and independent States; that they are absolved from all allegiance to the British crown, and that all political connection between them and the State of Great Britain is and ought to be dissolved." This was the first

step. It was intended as a feeler. The lighting was in the hearts of the people and only needed an electric touch to cause it to flash upon the world. That touch had been given. But how timidly the great actors in this mighty drama came upon the stage. The resolution was seconded by John Adams. A long and warm debate followed. Many members were afraid to take the decisive step. They still hoped that the eloquence of Chatham, and the influence of Rockingham might effect an honorable reconciliation. It was finally agreed to adjourn the discussion of the question until the first day of July. The time arrived to consider the resolution. Fifty-four members were in their places. The outlook was ominous. The business of the day began by reading a letter from General Washington, who returned the whole number of men under his command who were fit for duty as seven thousand, seven hundred and fifty-four. Many of these were volunteers for a year, whose time of service was nearly out; all needed money, clothing, and ammunition, and Congress had no credit, and no power to levy a tax. Sir Henry Clinton had just arrived before Charleston with a line of battle-ships, and the safety of the place was in doubt. New York was threatened by Lord Howe, with a formidable armament that had already arrived at Sandy Hook. General Montgomery had panted out his brave soul under the walls of Quebec, and the little army that had invaded Canada with fair hope of success, was on the retreat, badly shattered by disaster and disease. The Indians on the frontier were already on the war-path. As yet no foreign power had sent a word of sympathy that could kindle a ray of hope in the bosom of the most sanguine. Such was the state of affairs on the morning of the first of July, 1776. Is it any wonder when the order of the day was announced that for a few moments there was a profound silence. Who could foresee the future? There might be defeat, confiscation, and the scaffold lurking in the silent coming months. John Adams broke the solemn stillness by a speech, which tradition says was impressive, impetuous, and powerful, and like a mighty torrent, swept away every objection; and on the evening of the second day the resolution passed, only one dissenting colony, New York, not yet able to concur. The Rubicon was crossed. The old thirteen British Colonies stepped forth among the nations of the earth free and independent States. A committee was immediately appointed to prepare a formal statement of the reasons of the separation. Mr. Jefferson drew up the paper, and showed it to Adams and Franklin, who made only a few verbal corrections, and Congress entered upon the consideration of the document. For two days its statement of principles and reasons were sharply analyzed, and every word critically scanned. On the Fourth of July, 1776, it received the approval of Congress, and copies were ordered to be sent to each State, and that it be read at the head of the army, and it was everywhere received with an unbounded, spontaneous enthusiasm by the people. As long as this day is cherished in patriotic memory, and the sentiments of that memorable document burn and glow in the hearts of the people throughout the land, the stability of the Union is assured, "One as the Sea but multitudinous as the waves."

Map of Alaska.

The large map of Alaska which we publish in this number of the MINING AND SCIENTIFIC PRESS, was drawn for us by Mr. W. D. Patterson, C. E., from latest available data. It takes in those portions of the extensive region which are of interest to the miner and prospector. By it may be seen the main water courses of the territory, by means of which inter-communication is carried on. Of course, on such a scale, it would be impossible to delineate the smaller streams. Yet there are thousands of them in every direction, as might be expected from the character of the country.

The coast line of Alaska is indented with harbors and rivers, from one end to the other. "Hundred harbored Maine" does not possess a more ragged coast line. Smaller courses run to the waters' edge everywhere, making it difficult to penetrate the country much back of the river lines.

Our map, which we engraved especially for this edition of the PRESS, will be useful to all interested in Alaska. Where possible, we have indicated the geological formation; but the region has been only slightly prospected, and complete data are wanting.

Mining Machinery.

Mr. Edward A. Rix has recently leased the whole of the large building on Fremont near Market street, formerly occupied by Jonathan Kettridge, and has remodeled it and made extensive improvements, to adapt it to his growing business. It is now arranged to carry on a general machine business. Mr. Rix also carries on the business of the late Mr. Kettridge, making iron shutters, doors, etc. The shop is particularly well lighted, the proprietor having sacrificed considerable floor space in order to have good light on the lower floor. No shop in town is better arranged in this respect. The forging and machine shop has all the necessary tools, lathes, planers, etc.

Mr. Rix makes a specialty of small steam engines for general work. He makes one with boiler and all, for small work. He is also agent for the well known Knight water-wheel, which is in use in many parts of this coast. Aside from the general mining machinery, in which Mr. Rix deals, a specialty is made of the Rix hoist, a very effective type of machine for its purpose, strong, durable, and of a type which experience has recommended. Quite a large stock of wire rope is also being taken in. This rope is made in St. Louis and Mr. Rix has now an agency for its sale. The Heald & Morris horizontal engine is also kept in stock.

The principal business carried on, however, is that connected with the National rock drills and compressors. These drills are all over the coast. There are 30 of them running on the Oregon and California company's road. There are 12 or 15 in the Idaho company's mine, Nevada county, and also five in the Conpromise mine, Conterville; two in the Sierra Buttes, etc. A mine in Montana has just ordered 16 of these drills, which we are informed is the largest single order of the kind ever given on this coast. There are a number of small mines here using one or two of these well-known drills, among them may be mentioned the Murchie, Springfield, Pacific, Empire, etc. Mr. Rix has furnished drills and compressors for all of the railroad plants on the coast.

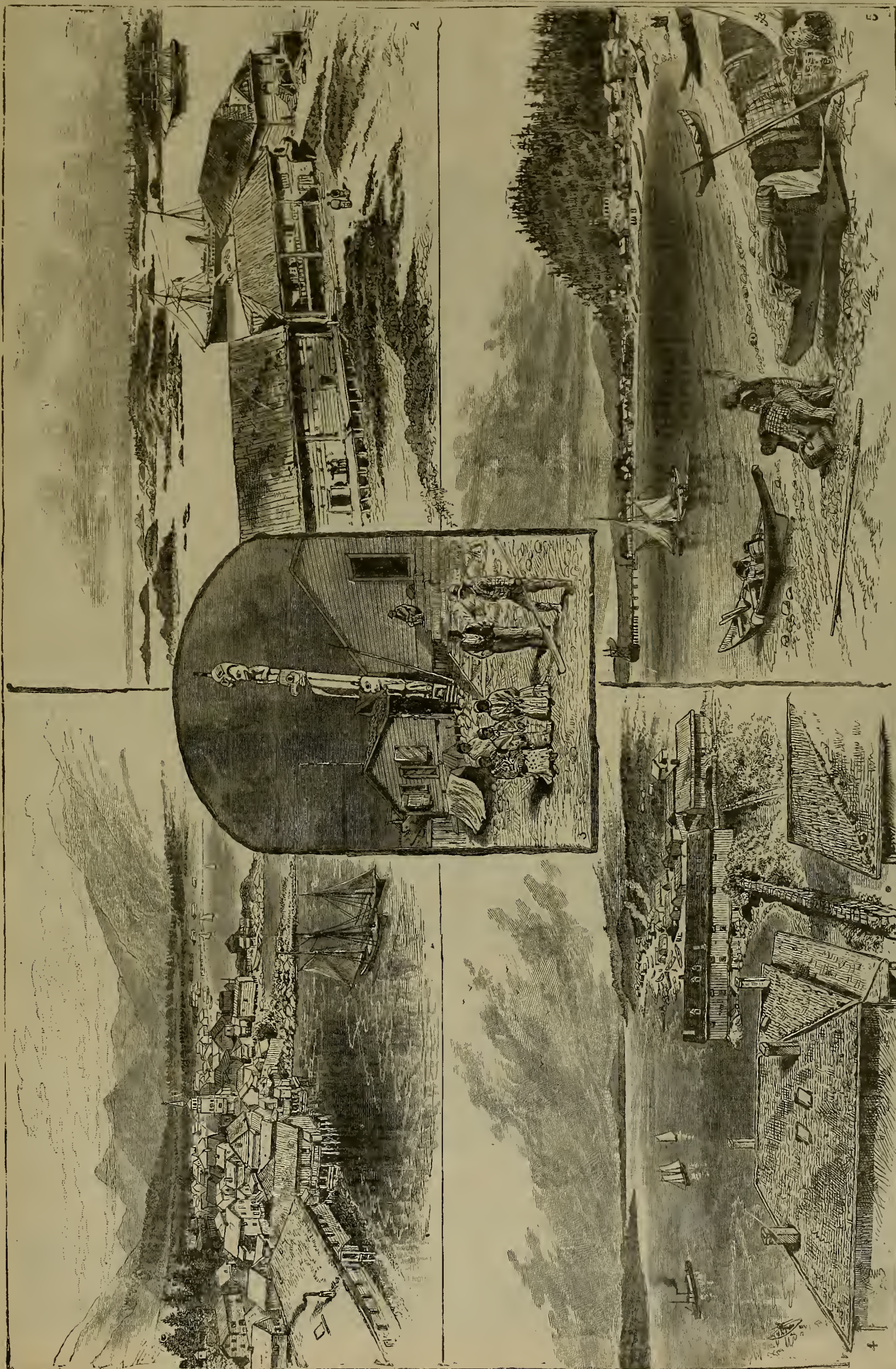
The new front on the old building has greatly improved it. The floors have been fixed up and the general design remodeled. There is an incline from the basement to the sidewalk, divided with a track for a car, a wire rope with power being used for hauling up heavy material from the lower shops. Mr. Rix did not have sufficient room at his old place of business but now has commodious premises well adapted for a growing business.

Immigration.

In compliance with an invitation from the Sacramento Board of Trade, Arthur R. Briggs, president of the Immigration Association, and C. H. Street, secretary, appeared before the board last Friday evening in Sacramento, with a view of interesting the merchants of that city in a plan to bring the northern and eastern portions of the State more prominently before the people of the Eastern States and Europe. It was proposed by Mr. Briggs that the Sacramento merchants raise the sum of \$3,000 for the purpose of platting the government lands in those sections of the State tributary to Sacramento; and also for taking the field notes from the books of the office of the Surveyor-General, and to make a personal examination of the lands, the work to be published in pamphlet form for distribution. Mr. Street exhibited the plats of Butte, Lassen, Shasta and Placer counties, as made up in the office of the association, which showed what lands were open for settlement, available for agricultural purposes etc. It was estimated that 25,000 families could be located in the fourteen counties tributary to Sacramento on available government land, besides which there is a large area of timber, mining and swamp lands. The Sacramento merchants favored the proposition, and those present subscribed the sum of \$900 for the purpose, and appointed a committee to canvass for the sum required. It was proposed that subscription be made at a basis of a certain sum for twelve months, the subscriptions to be made in quarterly installments to the Board of Trade, and by them paid over to the Immigration Association.

Alaska Scenes.

On page 481 of this number of the PRESS are several fine views of Alaska scenery. Figure 1 is a view of the town of Sitka. Figure 2, shows Sitka Harbor, looking seawards with its numerous wooded islands and protected anchorage. Fig. 3 is one of the legendary carvings found at Fort Simpson and other localities. These images are not worshipped, but are rather historical or legendary. Fig. 4 is an Alaskan river scene, the houses and huts of the villages clustering along the bank. Fig. 5 illustrates Wrangel. All these localities are more fully referred to in other parts of this issue.



SCENES IN ALASKA HARBORS AND RIVERS OF THE NORTHWEST COAST OF AMERICA.

Prospecting in Alaska.

From a conversation we recently had with an Alaska miner, who has spent several seasons there, we were given the impression that the country is rather a bad one to prospect in. Strangers not used to the Indians have the most trouble. The Indians know those persons who have passed several years there. The old hands have, therefore, the best chances. The natives are more liable to commit depredations on strangers. The moss, bogs and timber are great hindrances to the prospector's work. Canoes and boats have to be used for transportation. After a mining camp is struck it is all right, but hunting up the camps is hard work. Rivers, mountains, timber, marshes, etc., are serious obstacles. When a lot band together as did the men who went up the Yukon last year, it is all right, for they can take a small steamboat.

The ordinary prospector cannot do this, but must carry provisions long distances and otherwise rough it pretty hard.

The dense mass of moss which covers so much of the ground is the worst obstacle, however. Men can make but few miles a day with such walking. At any time they may slip through into boggy, wet ground. To do any prospecting, they must remove this covering of moss. On the coast it is not so cold, but in the interior in winter the cold is extreme.

Harrisburg is 180 miles from Sitka, and is the same distance from Wrangel that Sitka is. Wrangel is an unimportant place that the Cassiar mines built up. For three or four years there was good leads, but now there is little doing.

Some few men stay at Harrisburg all winter, and there is some little work done on the ledge or the island. With its very short days, and its cold, little can be done in the winter; it takes about all the available time to gather wood to keep warm with.

None of the men ground-sluice. Little is being done with quartz on the main land. Four years ago there was quite a rush to Alaska, but last year few men went. Men have been pushing into the interior for the last three years. They go up the Chilcat river as far as they can, and then pack across the range and get some gold; they even go over into British Columbia; They try to get on the continuation of the Cassiar gold belt.

About Harrisburg there is nothing in the creeks at all; and this is the case elsewhere. The auriferous gravel is on the hills, but there is no "wash" down below. The gravel has evidently been formed by glacial action and the gold has not been washed down into the hollows and ravines, as it has in this country. In ordinary gold-bearing regions men prospect the creeks first, here they do not; the experience about Harrisburg taught the miners this.

The country is a bad one for a man to get "broke" in, because there is no chance for him to get days-work, and distances are great with few settlements. Men without means should never think of trying to do anything mining or prospecting in Alaska.

Surface Mines at Harrisburg, Alaska.

In conversation with a miner, who owns claims at Harrisburg, we were told that the claims are in high banks or benches, and the gravel is from three to twenty feet in thickness. The material is a sort of decomposed stuff—a mixture of broken quartz and other debris. Sometimes a reef of quartz will be met with in the gravel bed.

Water is plenty, and is brought to the gravel beds in ditches from the creeks. There is no company furnishing water, the miners bringing it themselves to their claims. The season lasts from five to six months, but varies considerably. The miners at Harrisburg take up 200 feet frontage on the hill ground and 1,000 feet running back. Most of the mines are on the mainland, but there are some on the islands. There are two companies mining on Douglas island.

All the region close around has been taken up. Some little prospecting outside has been done, but it has not paid. The mines are not in a regular gold belt; it does not seem to be a regular wash. The belt cannot be traced at all. Wherever stringers of quartz are found, placer ground is met with around it. The quartz and placer ground have to be recorded separately.

The creeks do not yield gold. The "basin" is two or three miles above Harrisburg, and diggings are around this basin. Hydraulic nozzles are used there, the same as we have in California. The character of the gravel is different, for it is broken up by glaciers, and not in the shape it is as with us, where water has acted upon it.

Alaska Mines.

Placers and Quartz near Harrisburg.

(From our Alaska correspondent Geo. E. PULZ.)

In all the reports and letters written about our Alaska country but very little truth or correctness has been shown. But I feel it my duty to say something about our country to the public from my stand point. Since the discoveries of the Harris mining district two years ago last fall, Harrisburg has had but very little attraction for outsiders; yet we must not be thrown entirely in the shade. But very little having been done with our mines but light prospecting, we are still rather obscure, although our little settlement has done very well for itself. It has started out on its own merits and I expect will have to keep on to work up on its own merits. Being so far away and cut off from any other country, it is no wonder that we have not come before the notice of the public more than we have. The placer mines about whose uncertain prospects I wrote you two years ago, not being an expert placer miner myself, have far outreached my estimates. With a small lot of 100 miners in 1881 the camp produced from reliable authorities \$150,000 in gold dust, for which amount I can also vouch, as a close observer; in 1882 everything had to be started up, as the camp was new. No houses, roads or trails were built until June, 1881, and every claim had to be first opened and prospected. In 1882 the season was unusually late here, as everywhere else. The late season and the deep snow did not allow the miners to commence work until six or eight weeks later than the year before; then the season has closed early also, although, so far as I can gather data, the camp has produced, for about three and a half months working time, over \$200,000 in dust. This is placer product alone. I have learned that the production of the above amount is distributed among the different claims as follows: The Island claims consisting of Williams & Co., averaged from 80 to 132 ounces per week regularly for twenty-six or twenty-eight weeks. These are the only claims that were able to put in a good season, they being the lowest ones. The Powers claim produced above 25,000; the Harris and Janran about \$12,000 or \$14,000; the Bulger Hill Co., \$15,000 to \$16,000; Grey & Co., \$8,000 to \$9,000; Leary & Co., \$8,000; Franklin claim, \$10,000; Bordrean & Co., \$8,000; Dix & Co., \$10,000; R. Driver, \$5,000; N. Latour, \$4,000; Howe & Co., \$4,000; Hillwell & Co., \$4,000; McGinnis Creek, \$8,000; Lemon Creek, \$6,000, and a large number of small claims that have done equally well. The expense of extracting these amounts has given employment to about two hundred white men at from \$3.50 to \$4 per day, and about four hundred Indians at from \$1.50 to \$2.00 per day.

These amounts of dust were obtained by Ground Sluicing

On top of the quartz ledges, by washing the decomposed quartz through the sluices, and it is no doubt that the percentage of gold saved in this way does not exceed 40 to 50 per cent of the actual value of dirt worked. The gold has to be saved by quicksilver. There are but very few of the claim holders who understand amalgamating. So they most all have but a short string of boxes from 60 to 100 feet long, mostly set at an angle of 6 to 12 degrees, through which is rushed the dirt by turning on every inch of water the boxes will carry, and by rushing boulders through as big as the boxes will carry them. The gold is all small grained, rough (as it comes out of the oxidized quartz), and stands but very slim show to get to the bottom of the boxes, and to come in contact with the quicksilver. Besides, the gold is more or less coated and rusty, our ores being all sulphate ores, and the gold only having been freed through oxidization.

All these placers are

Located on the Hillside

Around the quartz ledges. None are worked in the creek bottoms or gulches, although very good prospects can be gotten in the water-courses, which are only used now as tailing dumps. The quartz mines are still but little explored, and it will take some time and capital judiciously expended to show up the true value of our quartz mines. The best success in quartz has so far been reached through the judicious management of the Alaska Gold Mill and Mining Company by its superintendent, Mr. John Treadwell. This company owns a couple of

Locations on the Douglas Island.

About a half mile across from this burgh, and undoubtedly possess one of the biggest mining properties on this coast. The placer miners, having illegally taken possession of the surface of the company's property, have had for some time several hydraulic giants working on the ledge, wherever the ore is decomposed, in places to a depth of over 10 feet, but they have done good, inasmuch as they have shown up the ledge to its full width, which is over 800 feet at this company's ground, and as wide as 1,300 feet on other points of the ledge. There is a 5-stamp mill on the island. Mr. T. cut into the ledge, which raises from the hanging wall to the foot wall, over 400 feet, and started several tunnels—one at the hanging wall, and several on other parts of the ledge, running south from the foot wall. The ores which were extracted from these tunnels (every particle was

ore) he put through the mill, and it yielded him, in free battery amalgamation, from \$5.50 to \$12 in free gold. The concentrated sulphurets showed a percentage of from three and one-half to eight per cent, assaying from \$85 to \$160 per ton, making an average, so far as worked and tested, of over \$11 per ton. As the tunnel approaches the foot-wall the ore increases in value, as is shown by both milling and placer mining.

It is to be hoped that Congress will before long take final steps to give us some sort of civil government, so as to prove rights and ownership. Undoubtedly with the present prospects the Alaska M. & M. Co. would not hesitate to erect a suitable reduction works, to insure them large dividends, but I suppose they do not choose to start in to much litigation as that might cost more than the mines would justify.

With the mines on the mainland but little has been done, owing to the scarcity of funds. The mill, erected by Webster & Co., was six months in erecting, and, when completed, was so badly managed that nobody wanted to take any ore to the mill to be worked.

There is plenty said and written in this place about mines by persons who never saw a mine in their lives, and who have followed farming, wood-chopping, hay-ranching, etc., until coming here. Yet the public accepts their opinions, and employs them as their agents to show up the merits of this country. Several new districts, and discoveries were made here during the last season; prominent among these are the coal deposits at Murder Cove, at the south point of Admiralty Island. Some very good and large ledges were discovered, located at Montana creek, McGinnis creek and Mount Goat creek, all west of this place on the mainland between here and Lynn canal. Through personal inspection, I found a belt of large and well-defined ledges, carrying high-grade gold ore. The principal one among these is the Telegraph and Alexandre lode, which shows, for a distance of a couple of miles, a strong, well-defined ledge of from 50 to 100 feet in width. Here, also, the placer miners have again followed the quartz prospectors, and, regardless of prior locations, gone to work ground-sluicing off such parts of the ledges as they find to be decomposed. At Cross Sound, near Noonah, is a splendid marble deposit. I visited the place and found a large belt of marble, which carries in its center a stratum about 50 to 100 feet wide, of the purest white fine-grained marble, which will rival any Italian marble.

E. Bean, who spent some months last season between the headwaters of Chilcat and Yukon rivers, brought out some splendid high-grade copper samples, of which he claims he found a large belt of a mile wide and about twenty miles long, claiming it to be about fifteen miles from deep water navigation, covered with heavy timber and near water. The prospecting parties for placers on the Yukon, report satisfactory prospects on the McMillan and White rivers.

Scenery of the Northwestern Archipelago.

The course of the average ocean steamer on the "inland passage" to Alaska, is about as crooked as the most fastidious could wish. For instance, says a *Bulletin* correspondent, we called at Victoria for ship's supplies and for discharge of freight, being detained thus twelve hours. Then we steamed up the gulf of Georgia, directly on our way, for about ninety miles, to Nanaimo, where we coaled under difficulties, from the great Wellington mines. Across the little Departure bay, little more than a pistol shot from the chute of the North Wellington mine, we observed a group of deserted and weather-beaten cabins, on the point of the beautiful little New Castle Island, whence was quarried the fine building stone, for the San Francisco branch mill. Putting off from this same point of land, is the wreck of a pier, reaching back into the bluff and losing itself in the cloud of smoke which day and night lingers in eddies over the same spot. There, we were told, was the famous New Castle coal mine, the oldest of the Pacific collieries, which was abandoned several years ago, because of the unquenchable fire which had been kindled within its walls and filled all its caverns and corridors with death, and thus shutting down one of the finest coal mines on the coast. But I am imitating the digressions of our steamer. From Nanaimo we returned over the same course by which we came from Victoria to Port Townsend. This doubling on our course cost us nearly 200 miles extra travel, and a very annoying delay. Packed with freight, we left Port Townsend at midnight, and in the forenoon of the next day we were off Nanaimo again, on our journey up the coast, and henceforth we had no more delays to speak of, and no particular incident or event worth mentioning.

Grand, but Monotonous Scenery.

For the tourist will see all through this wonderland a thousand things which he can describe neither by mouth, nor pen, nor brush. There is at first a thrill of pleasure, mingled with awe, as one enters this almost limitless sweep of inland, island-studded seas. The charm of the first consciousness that you are being, without a jar or jolt, borne over these narrow seas, almost fathomless in their unbroken depths, winding in and out among tiny islands, covered with forests and veined with various minerals, is well nigh irresistible. The average tourist has no disposition to resist the spell. He surrenders unconditionally. But as

the scene broadens into empires and continents, and sweeps on and on for hundreds of miles in unbroken and unvarying grandeur, the prisoner chafes under the burden of his bondage. There is a surfeit of wonder, the mind reacts, and the traveler would hail with real pleasure the sight of a something common. Indeed, when the morning broke upon us in the little mining village of Harrisburg, there was many an old miner who almost wept as he recognized, in the shadow of mountains of eternal snow, the rude cabin of the gold hunter, and a simultaneous exclamation of pleasant surprise broke forth from our uninitiated passengers.

Harrisburg and its Mines.

At Harrisburg many of our passengers found their destination, at least for the present. Their tents were soon spread upon the rainy beach, and long before night scores of them were off to the gold fields. Strolling, or rather stumbling and climbing through the dripping, mossy, muddy town we found the whole of it mapped off in mining claims, while through the center a sluice was running full of muddy water. Some of the miners gave us good reports from their diggings, but there was what at first seemed to us a puzzling reticence and half-heartedness about even the best reports, by which the hurrying stranger would be easily deceived. But if you could get into the confidence of one of these same men, you would readily have solved the whole puzzle, and you would be prepared better to estimate the miner's confidence in his mines. I found the absence of civil government a serious barrier to all the mining and industrial interests of Alaska. Men, as a rule, are a little afraid to say they have a good mine or a good business of any kind, lest some adventurer in the absence of human law, and regardless of all higher law should dispute their right by superior force, cunning or downright meanness, and thus indirectly rob prospectors of all they have found or can hope to find. I was shown what I am convinced is a valuable quartz mine, one of the largest in the world, I was assured, which would long ago have been fully developed, but for this uncertainty. As it is the proprietors are simply holding it and waiting the dawn of the light of civil government. But in spite of all their rights and their vigilance, large sums have been taken from the "placers" that cover the rock above, while hundreds of thousands of dollars, I was assured by the Superintendent of the mine, have been wasted through careless and slovenly mining by those who have no right to a foot of it. Miners are now scraping up the "tailings" on the beach hundreds of feet below the claim, and washing out in rockers good wages. By the time we were ready to leave Harrisburg at midnight, many of our gold-hunting fellow passengers had "seen the elephant," and armed with tickets for Victoria, Portland or San Francisco, returned by the same steamer that brought them. They were thoroughly disgusted. Others more timid never gave up their staterooms; while others still would gladly have clung to the boat until she had borne them out of the country forever, but, alas, they were "dead broke," and must stay a while longer at all hazards.

Other Mines.

Some of our gold hunters pushed on for the Chilcat country, landing in Pyramid Harbor and packing across the portage to the interior. In about thirty miles they reach the Yukon tributaries. Some good prospects have been found in the interior, I am told, but nothing seems to last. Mines suddenly "pinch out" or wash out. Some good claims which for two years were known to pay \$60 per day to the man, are now entirely abandoned. There are also said to be some good prospects on Admiralty Island, but on the whole I am convinced that the mining outlook in this part of our great northwest Territory is not such as to encourage any great rush. Indeed, I am inclined to utter a kindly word of warning to young men of small means against coming to Alaska for any business just yet. For men of ample means and energy there are no doubt some fortunes up here, but under the most favorable circumstances such fortunes can only be acquired by the hardest industry. However, it must not be supposed that Alaska is poor in resources. Far from it. She is unquestionably rich in fish and furs.

IT WOULD NOT WORK.—The experiments recently made at Tiernan & Co.'s quartz mill demonstrated that the newly-invented Golden Gate sulphuret concentrator will not do the work that was expected of it, and the agent has boxed it up again and bid good-by to the scene of the failure. Tiernan & Co. have ordered two Frue concentrators, which machines have been in operation in all the mills in this district for several years past, and have never yet been found lacking in any respect. They are easy to keep in order, moderate in price, made of durable material, and save a larger percentage of sulphurets than any other ever invented.—*Norfolk Transcript*.

PERSONAL.—Mr. A. T. Dewey, of the firm of Dewey & Co., proprietors of this journal, is residing at Highland Springs, Lake county, with his family. Mr. Dewey is taking a much needed rest from business cares, and his employees trust he will return from his vacation with renewed health and energy.

The Paris municipality has devoted ten thousand francs to defray the expenses of delegates from Paris to the forthcoming Boston exhibition.

Alaska Bears.

The Size, Food and Habits of the Species

(Read before the Academy of Sciences by Ivan Petroff.)

During the past winter, while engaged in compiling maps showing the distribution of fur-bearing animals in Alaska in connection with my report on Alaska, I had occasion to consult authorities on the proper names of the various species of Alaskan bears. With the black bear, *Ursus Americanus*, and the polar bear, *Ursus maritimus*, or *thalassarchus*, there was no difficulty, but it was different with the so-called brown bear of the traders. Dr. Dall, in his list of Alaskan mammals, gives us both the grizzly, *Ursus ferox*, or "brown bear," and the Barren Ground bear, *Ursus Richardsonii*. At this date it is safe to say that *Ursus ferox* does not exist in Alaska, though the so-called brown bear resembles him much in size and disposition. I found him in all parts of Alaska visited by me, with the exception of the Aleutian Islands west of Oonimuk, his range being nearly as wide as that of the fox and mink. Richardson described the Barren Ground bear (subsequently named after him) as of nearly uniform yellowish or brownish color, tips of fur paler on forehead and back; forehead broad, legs long; claws intermediate size, between *Americanus* and *ferox*; dimensions 5 feet 2 inches in length by 2 feet 9 inches in height. This description does by no means fit all the Alaskan brown bears, or even a majority of them, but it comes nearer than any other authentic description at our command, and consequently Mr. F. W. True, of Washington, advised me to adopt for my maps and reports the name of *Richardsonii*, which I agreed to do under protest. With Mr. True I examined over fifty bearskins in possession of the National Museum at Washington, but, strange to say, not one of them was from Alaska, and I was only able to point out those which most resembled the animal I had in my mind. My personal acquaintance with

The Alaskan Brown Bear

Is of long standing. Nearly nineteen years ago, I found myself in a log house on Cook's Inlet, in the month of December, when all bears of regular habits ought to be hibernating and asleep.

One morning, at about ten o'clock, when my lamp was still burning, I heard a rattling at the latch of the hall door. Believing it to be an Indian boy, I opened the door, and saw, instead a bear. Without stopping to ascertain his species, I threw the burning lamp at him, and ran for my rifle, while the astonished animal made for the woods in great bounds. I examined his tracks in the deep snow, and found that I could just fill the impression made by the bear's forefoot with the fingers of both hands widespread, while the hind foot was nearly as long as my arm from the elbow down. My acquaintance with this species was not renewed for some time, but I had frequent opportunities for measuring skins. From fifty measurements I obtained an average length of considerably over six feet, and a distance of three and a half feet between the center of the back and forefoot. In many instances I measured skins of over eight and nearly nine feet in length; one measuring nine feet and nine inches bore evidence of having been stretched. According to my experience, the Alaskan brown bear is fully equal in size to the grizzly, or even the average Polar bear, and certainly much larger than the Barren Ground bear or *Richardsonii*, as described by Richardson himself. The broad forehead distinguishes it from both the white and the black, and the claws are less formidable than those of the grizzly, rarely exceeding three inches in length.

In his habits, which I had many opportunities of observing, the Alaskan brown bear

Differs Much from all Other Species

Thus far described. He does not climb at all; he shuns the timber, except for concealment in the daytime, and exhibits an astonishing predilection for swamp and marsh land, where one would imagine locomotion to be extremely difficult for so ponderous a body. If he hibernates at all, he does so only in the far north. In the continental region south of the Yukon river, the male at least is abroad at all times of the year. He is not opposed to working for his living, and plows up whole hillsides with his claws in search of roots or small rodents. He is also the great road-maker of Alaska. His enormous weight and broad understanding enable him to leave a trail of comfortable width, and, as he is of methodical habits and loves to follow beaten trails, he makes a road easier to follow and travel over than any Indian trail trodden by successive generations. During my earlier wanderings in Alaska, I was often puzzled by finding well-beaten trails along the crest of high, narrow ridges, and in the most inaccessible places, knowing, as I did, that the natives could not be induced to climb even a hill of moderate height. I confess that the road-making is not intentional.

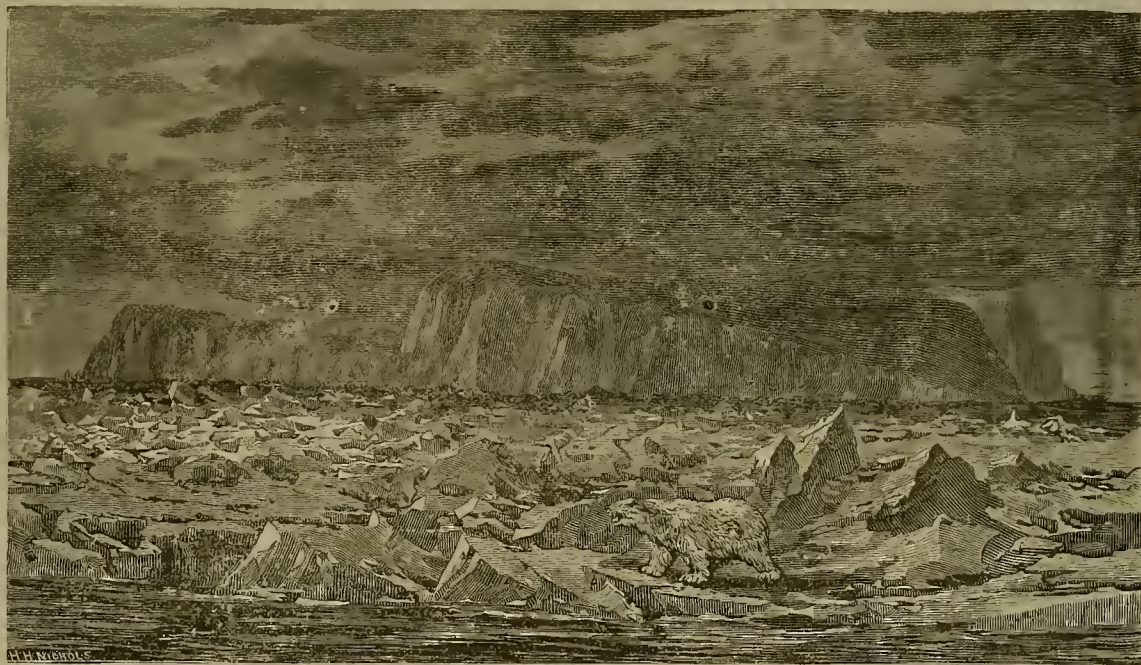
The Alaska Bear as a Fisherman.

As a fisherman, the Alaska brown bear displays skill, ingenuity and prescience. When the salmon begin to ascend the countless streams of Alaska, on their journey of reproduction, the bears repair to the banks and begin operations. Their fishing is done chiefly at night, but in well sheltered spots. I have been able to watch the process in daytime. On the larger rivers, a smooth, sloping bank is select-

ed, upon which the bear stretches himself comfortably and scans the water. If it be clear, the movements of the silvery or brightened fish can be easily followed, but even in muddy streams the bear knows the right time to strike by watching the ripple caused by the salmon's progress. A sudden plunge or sweep with one huge paw and one or more fish are brought out on his extended claws. This is the most common process, but frequently a fallen, half-submerged tree is selected as a point of vantage. In every instance the live fish is carried to some distance from the bank to be eaten and this we must ascribe to reasoning, as later in the sea-

ness of these bears than I am. In disposition the Alaskan brown bear resembles the *ferox* to a certain extent. He will attack man upon the very slightest provocation, and sometimes without any apparent cause. I have seen a bear whom I accidentally wounded at very long range attempt to reach me by crossing a wide river with a six-knot current, to simply avenge himself. The natives in nearly all parts of Alaska consider this bear as exclusively a man's game, while the black bear is much hunted by boys, who shoot arrows into him and kill him gradually, while he endeavors to extract the shafts. On the seacoast both the brown and black bear

saw one skin suspended from the stern of the United States steamer *Thomas Corwin*, which touched the water fully eight and a half feet below the rail. The largest cask at St. Michael's would not hold it for shipment to San Francisco. The shore range of the polar bear in Alaska lies chiefly beyond Bering Strait, but specimens are encountered every year on Norton Sound, and even far down the Yukon delta. Saint Matthew's Island (uninhabited) seems to be a favorite resort of these animals. In this paper I have endeavored to support my belief that the huge, deep-furred, brown-yellow bear of Alaska, with his wide



HERALD ISLAND IN THE ARCTIC OCEAN.

objection to fish, when it is of "high" flavor, than has the Alaska native. One night I watched a huge fellow feeding among the windrows of dead salmon left upon the sand-bars by the receding water of the river. It was quite dark, but the strong phosphorescence of decaying fish made it appear as if the bear was making a meal of fire. In the months of July, August and September berries are plentiful, and the bear begins to vary his diet, subsisting to a great extent upon the most toothsome berries.

In the Coast Regions.

Where the snow does not fall deeply, this food is obtainable nearly all the winter.

Another delicacy much sought after by these bears is the stalk of the wild celery, which

dig clams when the tide is out, and in times of scarcity they do not scorn a meal of seaweed.

The Black Bear of Alaska

Does not range beyond the timber line, and has a strong predilection for mountainous country. During berry season his flesh is quite palatable, though of coarse fibre, but the meat of the brown bear is repulsive to civilized palates at all times of the year. At Prince William's Island, where both the *Americanus* and the *Richardsonii* are found, I have seen skins nearly black, but of coarse texture, of the brown species. In view of the great difference in their habits, I am unwilling to believe in a mixture of the species, and perhaps the change in color can be accounted for in some other way. The natives of that region assured me that the

range of territory, and with habits peculiarly his own, is, perhaps, entitled to the honor of a separate species. Personally I entertain the greatest respect for him, but I have observed him only as an amateur, and must leave it to those who make natural history a profession to fix his exact status, whatever may be his standing among the other *urside* of Alaska.

Arctic Scenery.

In this number of the PRESS is a very interesting account of Arctic currents, referring specially to those on the Alaska and Siberian coast and on Bering Straits. The paper was written by Capt. Hooper, who made the memorable voyage in search of the *Jeanette*. One



THE CORWIN IN A NIP OFF CAPE ROMANZOFF.

son, the dead and half dead fish which cannot get away are consumed on the banks and river bars. Evidently the Alaskan bear has no more grows in bunches on the hillsides, looming up above the luxuriant grass. From the top of a mountain on Kodiak island I watched a family or group of bears, nine in number, feeding on this plant. They proceeded from bunch to bunch, and when I subsequently surveyed the field I found the grass trampled and beaten down around each bunch, but to my astonishment one stalk had been left standing in each instance. The solution of this puzzle I leave to those better acquainted with the true scientific inward-

females of the black bear bring forth their young nearly a month earlier than their off-colored sisters or cousins, which, if true, would indicate a further and corresponding difference, that would effectually prevent an intermixture of the two species.

The Polar Bear

Has been so frequently and so well described that I will merely mention that the *Ursus maritimus* of the Arctic coast of Alaska seem to exceed in average size those described by Richardson, who stated that they do not exceed six feet in length. I

of the accompanying engravings shows the *Corwin* in a "nip," and the other a view of Herald Island. These two engravings are reproduced in the PRESS as matters of interest in connection with Capt. Hooper's paper. They illustrate a character of scenery met with on the coast in winter in the northern latitude.

A cyclone passed over Elberton, Ga., on Sunday evening, killing Bynum Bell (colored), and blowing down sixteen buildings, including three churches.

Alaska.

Something General about the Country—
Geography.

[Read before the Geographical Society of the Pacific by
W. D. PATTERSON, C. E.]

The Territory of Alaska, purchased by the United States Government from the Russian Government for \$7,000,000, the formal transfer of which took place on Oct. 18, 1867, is partly situated between the 130 and 141 meridians west of Greenwich, and the 55th and 60th parallel of north latitude, and partly between the 141 and 165 meridians west of Greenwich, and the 55th, 71° 33' parallels of north latitude. The boundaries may be more particularly described in consonance with the treaty made with the Russian Government in the year 1825, by the British Government. The boundary line by said treaty commences at the head of Portland canal, situated on the 130th meridian of west longitude from Greenwich, and on the 55° 50' parallel of north latitude from the initial point. The boundary line trends along the coast at a distance of thirty miles from the shore line to Mount St. Elias. Thence follows a meridian line from the summit of said mountain to the Arctic ocean. Thence follow the coasts of the Atlantic ocean westward, and the Pacific ocean southeast and eastward to place of commencement. The summit of Mount St. Elias is situated approximately on the 140° 30' meridian of west longitude from Greenwich. The purchase from Russia was regarded at the time as a bad business by the people of the United States. Mock advertisements purporting to come from the Secretary of the State appeared in the daily papers of New York, etc., offering the highest price for waste lands, worn-out colonies and submerged and undiscovered islands, icebergs, polar bears, volcanoes and earthquakes. That Mr. Seward took a correct view of the benefits which would arise from the purchase, has been since amply proved. The area of territory purchased is about 400,000 square miles.

Climate on the Coast.

The existence of a branch of the Japanese warm stream carrying to this coast its waters imposes at the outset the necessity of a high isothermal line along the whole northwest coast of America. The records of the state of the thermometer established the fact. The botany and conchology of the whole region add their certain confirmation. The whole southeast coast of the Alaska peninsula is bathed by these same waters, which retain a high temperature to Kadiak, thence westward this temperature decreases, although the latitude decreases. The report of the botanist exhibits a flora that could not exist in this latitude without an unusually high isothermal condition, accompanied with a great condensation of vapor and precipitation of rain. The influence of the Asiatic current

at the Aleutian Islands is shown by the presence there of two species of *Haliotis*, three species of *Crepidula*, two of *Rissoirella* and other species which are more abundant and range farther north than their allies in the Atlantic. The temperature of the sea water at Sitka in the latter part of July, by observation made there, was at the surface 52° 1', air 54° 9'. At Kadiak Island, the temperature of surface water was 45°; the temperature of air was 48° 9'. Traveling on the same parallel of latitude, the temperature of sea water increases as we journey west.

The mean temperature of the year at Sitka,

renders progress through it very slow and difficult, especially when there is a heavy growth of wood and underbrush. At Fort Simpson, Chilkat, Kadiak, Unalaska and the islands westward this morass exists to the summits, or snow line of the mountains.

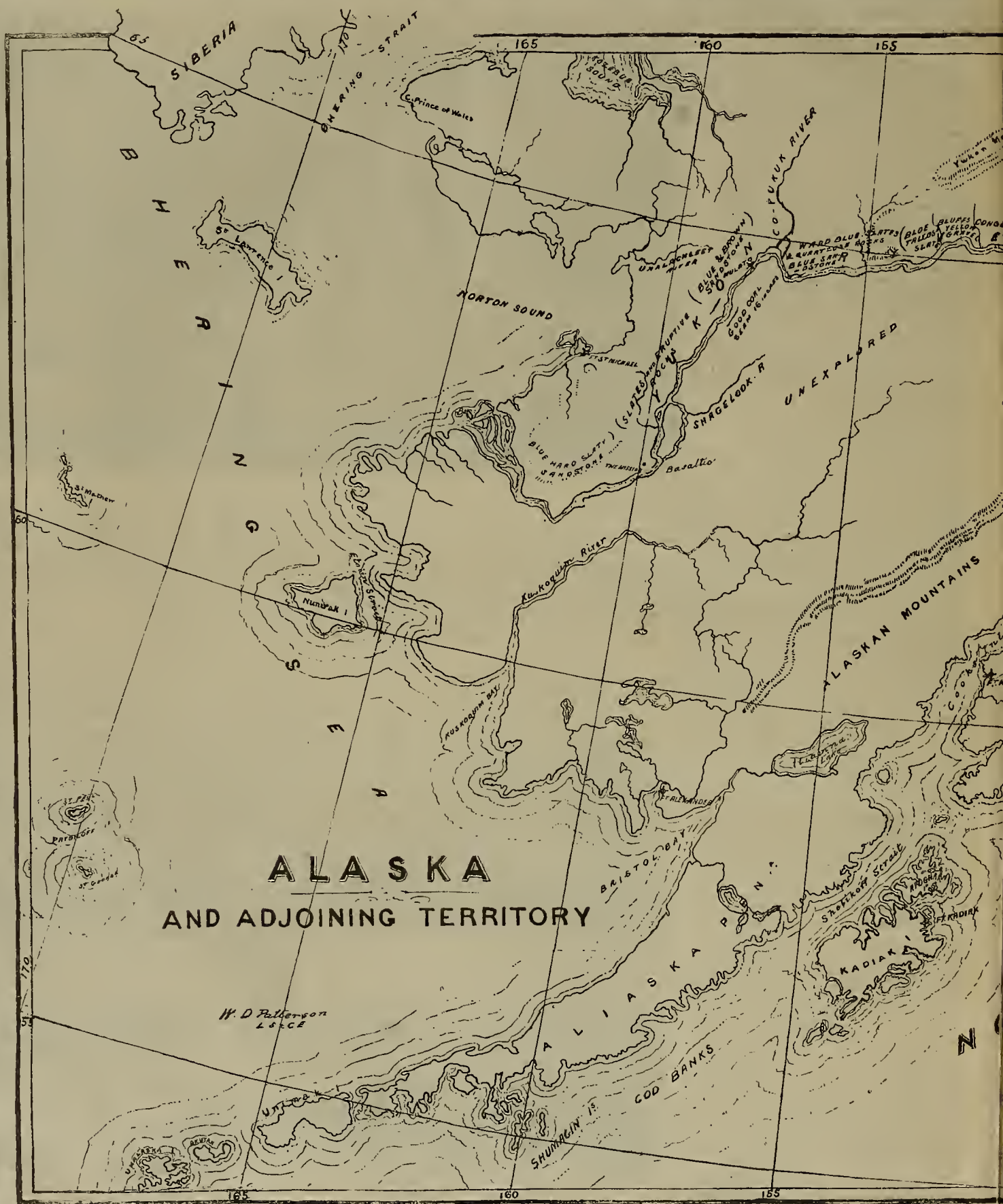
The Prevailing Winds.

In winter are easterly and if from the southward are accompanied with snow and rain; when from the north-east the weather is generally clear and cold. The fogs of New Foundland and Nova Scotia, have an incontestable claim to preeminence from their constant density to

is almost similar in character, being influenced by the Japan current on the north side of the Alaska peninsula, commencing from Bristol Bay and Pribiloff Islands. The Arctic current through Bering strait influences the climate, and the circumboreal fauna common to Greenland, Ochotsk sea and the extreme north of Europe are found.

Early Discoveries

It may here be noted that Norton bay was discovered by Capt. Cook, in the eighteenth century, and was named after Sir. Fletcher Norton, speaker of the British House of Commons.



in latitude 57° 3', derived from twelve years' observations, is 4° 9' Fahrenheit. The mean temperature of the interior of British Columbia, between the parallels of 49° and 54° north latitude is 41° Fahrenheit. The average annual amount of rain melted, snow and hail, that fell from 1847 to 1864 was 82.66 inches. The average rainfall in British Columbia west of the Cascades, in latitude 49° and 50°, is 50 inches. The whole extent of country subject to these rains is covered with *Sphagnum* from one to two feet in depth, even on the steepest hillsides. This carpet is saturated with water, and

those prevailing at Sitka at westward to Kadiak. The stormy weather commences in October and the winter breaks up about the end of March. March, April, May, June and July and sometimes August are good months with an average monthly rainfall not much greater than that on the Atlantic coast. The weather in Cook's Inlet north of 60° of latitude is said to be much better in summer than along the coast generally. The thermometer in summer rises to 95° and in winter falls to 55° below zero. To sum up it may be said that from Sitka westward to the Alaska peninsula the weather

Bristol bay and Cook's inlet were also named and discovered by this navigator.

Vitus Bering, a Dane by nationality, was drawn into the Russian service by the fame of Peter the Great, and his expeditions had been directly organized by that sagacious monarch. Peter did not live to carry them out. Their principal object was to find out whether Asia and America were one, or whether any part of their coasts were contiguous.

The Empress Catharine, as she endeavored in all points to execute most precisely the plans of her deceased husband, began her reign with

an order for the expedition to Kamtschatka. Vitus Bering was appointed commander. On the 4th of April 1728, a small craft was put on the stocks, at the town of Nishui, New Kamtschatka, and on the 10th of July, was launched and named the *Gabriel*. On the 20th he went to sea. Bering followed the east coast of Kamtschatka and Siberia, and discovered the Island of St. Lawrence. He reached as far north as 67° 18', and then found the coast turned to the west, whereon he seems to have come to the conclusion that he had reached the extremity of Asia,

vessels of his fleet got separated by a storm and each had to prosecute the voyage alone. The Aleutian Islands were discovered and other islands near the American coast. Many adventures were had with the natives. Senryv at last made its appearance amongst Bering's crew. They were finally wrecked, on a small island on the Asiatic coast, bearing Russian names were called after Russian navigators and discoverers. Those with English names, namely: Cape Suckling, Admiralty Island, Prince of Wales Island, etc., were named by Vancouver, or Cook of the Royal navy. Cook made a complete survey of

tance from Fort St. Michaels to the Yukon by this route does not exceed 230 miles; by the mouths of the river the distance is approximately 700 miles to the same point. On the morning of the 27th October, 1866 the expedition started from Fort Unalaklik traveling up the river of the same name. On the morning of the 9th instant they sighted the mighty Yukon, and at sundown they broke for the woods and stood on an immense snow-clad field of ice. The mighty Yukon from bank to bank was not less than a mile. This was at the Indian Village Koltag; thence they traveled 33 miles up stream

the building of the fort. Here the Telegraph party wintered. The coldest day for the season occurred on December 5th, when the thermometer fell to minus 58° Fahr., or ninety below freezing, but the weather was lovely and cold was not felt. Their bill of fare for Christmas dinner consisted of Soupe a la Yukon, Arctic grouse roast, Alaska reindeer meat, Nulato cranberry sauce, California preserved peas and tomatoes, dried apple pudding, gingerbread, a la Dali, iced cheese and iced water, winding up with a fair supply of tangleleg, or fire water and pipes. Fine auroral displays were witnessed by them; during the winter one took the form of a graceful, undulating snake of electric light—evanescent colors pale as those of a lunar rainbow ever and again flitting through it, and long streamers and scintillations moving upward to the bright stars which distinctly shown through its hazy, ethereal form. The night was beautifully calm and clear, cold but not intensely, the thermometer at 16° below zero.

The Yukon Tribe of Indians

Is the largest tribe on the Yukon river. They have a wilder and more ferocious cast of countenance than the Nyletes and other tribes. These tribes were much feared by the Russians. Behind the port of Nulato, in a small burial ground, Lieutenant Barnard, of the English, lies. He was landed at St. Michaels Oct. 12th, 1850, and from thence traveled to Nulato. The Indians, after murdering one Russian farther up the river, came down and surrounded the fort at Nulato. They stabbed the Russian commander of the port. The Englishmen fired several shots without effect. A powerful struggle ensued, at last overpowered by numbers they threw him down and stabbed him repeatedly. As they came from his house a Russian shot one Indian from a window, when the rest fled. The reason for the butchery is involved in mystery, but it may be as well to state this case in order that miners ascending the river be put on their guard. I have been obliged to stand guard for some days and nights with others at Penatsind sound, on Vancouver's Island, fearing an attack. The Indians on the coast require firm and kind treatment, and though a shot may never be fired, firearms, always ready for use, exercise a beneficial influence among them. I could, if time permitted, give many instances of Indian attacks and murders on the northern coast to substantiate my statement. The first



and that there was no connection between the continents. In the main point he was right, but he was totally wrong in his conclusion as to the Asiatic coast, commencing its westward course from the point reached by him, he returned to the Kamtschatka river without serious injury to his vessel. The second voyage was undertaken to discover the Pacific shore of America. After much trouble in transporting their goods and building ships, they at last, on the 4th of July, 1741, he went to sea, the port of departure being this time Petropavlovski. On the 20th the

the Alaska Coast as far north as Cape Prince of Wales; and Vancouver afterward sailed over the same ground and differed very little from Cook in observations to fix positions of capes and islands.

Geography and Climate of Interior.

The Ex. Western Union Telegraph Co. expedition up the Yukon started from Fort Unalaklik. By adopting this route they were able to cut off 530 miles. The distance to Nulato by the mouths of the river is 700 miles, but a land route to this place is employed in winter by the Russians traveling from Norton Sound. The dis-

on the ice and snow to Nulato, a Russian trading post.

Nulato is the most inland and also most northern of all the Russian Fur Co. posts. It is on the north bank of the Yukon on a flat stretch of open land bounded on the S. W. by the Nulato river, a tributary of the Yukon. Employees of the Russian Fur Co. were the first explorers of the Yukon Malakoff in 1838, and Derabin the following year reached this portion of the river. In the winter of 1843, Zagoskin of the Russian Imperial Navy arrived, having reached Nulato by the route just described, and he assisted at

Break-Up of the Yukon Ice

Occurred on the 19th of May at Nulato, which is 600 miles from the mouth. It is a mile and a quarter wide in other places. It opens out into lagoons four and five miles wide, studded with islands. It is navigable for 1,800 miles, for large bateaux, or steamers, and skin boats are preferable for voyaging through the ice, as they spring and give, and are not liable to be damaged as a wood canoe.

The Telegraph party made their final start from Nulato, to ascend the river, on the 26th of May. At this time the river was open, float-ice

running in the stream. About a mile above Nulato steep cliffs abut on the west side of the river, showing a blue sandstone formation with shale. Near the Coyukuk river the bluffs terminate on the river in a blue sandstone bluff.

A constant running survey was made by bearings and apparent distances, with many windings. The general direction to Fort Yukon is northeast. The weather was intensely warm, (this was on the second of June), the thermometer standing 72° in the shade. The evening and the early morn are the

Only Times for Traveling

In this country during the brief summer. The heat rises often to 80° in the shade. There is no darkness whatever; a subdued twilight stood in its place, and the sunset glow never left the horizon till it merged in sunrise on the 7th of June. The month of the Tanana river was reached. The country on each side is low and swampy. This was the farthest point reached by Russian traders, and is 240 miles above Nulato. This is a great gathering place for the Indians. In general character, they are good. Immediately above the mouth of the Tanana, the river Yukon narrows. This place has been named by the Hudson Bay Co. the Ramparts, a fortification from the crags and castellated structure, which tower grandly above. A long, low, occasionally submerged island of rocks makes an obstruction in the channel, and the water boils and fumes around them; but there are clear steamboat channels on each side through which the stream runs at the rate of about seven miles per hour. This part of the river abounds with moose deer. They are scarce below this and never found as low down stream as Nulato. They are a staple article of food for the Indians. The meat is excellent; far above deer, or reindeer meat. Moose, properly stewed down is a great luxury. When full grown they average from 700 to 1200 pounds in weight.

After three days' towing the party emerged from the Ramparts. These rapids will be, therefore, about thirty miles in length. The country then opens out low and flat. On the twenty-third of June Fort Yukon was reached. They thus ended their journey of 600 miles from Nulato, occupying 29 days, 26 of which had been engaged in actual travel. Here the sun on the 22d, now the shortest night of the year, set at a few minutes after eleven and rose about quarter past twelve, or the sun was only absent from their gaze 45'. They entered Fort Yukon, giving vent to their feelings in a volley of firearms, which was immediately answered from shore.

This Hudson bay post is now in American territory. The H. B. Co. were always aware that their fort was on Russian soil, but had an arrangement with the Russian Co. about this matter. The goods, confined to trading goods only, were always brought through the whole series of forts from York factory, on Hudson bay, the men of each post contributing something towards their transmission. The employees of Fort Yukon fetch their goods from La Pierre house, a small post at the head of the Porcupine river. This trip occupies them twenty days, camping regularly. A portage of eighty miles has then to be made, over which the goods are

Packed on Men's Shoulders

For the greater part of the distance from Fort McPherson, which is situated thirty miles above the confluence of the Peel river with the Mackenzie. The nearest fort on the Mackenzie is Fort Simpson, distant 1,500 miles from Fort Yukon.

Fort Yukon

Is the most remote of the H. B. Co.'s forts, and is in the high latitude of 67° north latitude approximately. The post was found to be far superior to the Russian post, having newly plastered walls, glazed windows, carpeted floor and open fire-places, and a general appearance of cleanliness. This was the termination of the W. U. Telegraph expedition. Mr. Ketchum and Lafarge, who returned from a trip to Fort Selkirk, when the Telegraph expedition people were at Fort Yukon, reported the river occasionally running through mountain gorges, but navigable for steamboats the whole distance to Fort Selkirk, of 600 miles; supplies of meat and game along the route good, and the Indians everywhere peaceable and desirous of seeing more of the white man. The trip had been made in 29 days, and camping each night ascending, and four days descending the stream without camping.

The General Course of the Stream

Agreed with Arrowsmith's maps. They brought with them from Fort Selkirk two pine cones, determined to be *Pinus contorta*; a variety observed on the River Yukon.

Fort Selkirk has been abandoned by the H. B. Co., on account of the great difficulty of keeping that fort supplied with goods. On the 8th July the telegraph party started down stream for Fort Yukon on their return trip. On the 25d they reached the northern mouth of the Yukon river 65 miles from Fort St. Michaels, and for the first time slept ashore.

General Remarks.

The fisheries of the Yukon are likely yet to be considerably worked. The finest salmon on the coast are found in the river. They are of two kinds, *salmo consuetus* and *salmo dermalinus*. The larger kind sometimes measures five feet in length. This variety is so rich that there is no necessity, when frying it, to put fat in the pan. Other kinds of fish, such as sturgeon, etc., are numerous. The timber on the upper Yukon is mostly birch and maple, interspersed with Arctic spruce, and in last June, 1882, a Mr. Schieff-

lin and his party ascended the Yukon river on a small stern-wheel boat, which they took up with them on a sailing vessel to the mouth of the river. They ascended to the mouth of the Tanana river and established a camp there. Schiefflin then went on a prospecting tour. He made discoveries, and found washings of sufficient importance to justify the detail of a courier to make the long and perilous journey overland to Sitka, in order to convey the news rapidly to his brother in Philadelphia. It is reported that the washings averaged \$1.50 per pan, and that in some instances \$10 per pan was produced. There is a steamer on the river which makes two trips each year. The river is frozen over until about May. For the ordinary prospector with small means, it will be a risky business, and a man must be well fitted out. But I feel confident that paying mines will be found at the head waters of the Yukon and Tanana.

Minerals on the Coast.

At Sitka, fruit trees were introduced in the governor's garden and special attention devoted to their culture, but they have not borne fruit. Berries abound throughout the country in great abundance; potatoes yield well. Turnips, beets, carrots, parsnips and the root crops, with cabbages and the like, are cultivated in a few gardens. Wild peas have also been found growing. Cranberries grow wild and are well flavored.

At Kadiak the weather is somewhat colder than at Sitka. The thermometer has never read below 18° below zero in winter. At St. Paul's vegetation commences in June, and grass springs forward with remarkable rapidity. It is usually out about the 1st of August and cures well and rapidly with a few warm days. The Russian company always kept hundreds of cattle here. Cabbages, carrots, turnips and potatoes are successfully raised. The mean temperature of the air in August is 50°. There are no trees of any size whatever, upon the Aleutian Islands. The timber at Kadiak Island is small, and yet is the source of supply for the Aleutian Islands. At Cooks Inlet the climate is warm. The climate is much milder towards the north than on the Atlantic seaboard on the Eastern shores of America. No forests are found above the month of the river Egg, about the 60° of latitude. On the western they extend as far as latitude 66° 44', or nearly 70° farther towards the pole. The sun being always above the horizon in summer, and the rays falling continually on the surface of the earth prevent the temperature from cooling too much. With the sun thus shining the growth of plants is rapid in the extreme. The snow has hardly disappeared before a mass of herbage has sprung up. The country from Norton Sound to Point Barrow is a vast morland whose level is only interrupted by promontories and isolated mountains. Inland from Norton Sound groves of white spruce are found till in latitude 66° 11' *pinus alba* disappears.

The Minerals on the Coast

On Cooks Inlet there is a vein of coal seven feet in thickness. Coal has also been found at Chatham strait, also at Frederick Sound, vein not very thick.

The most important discovery of coal has been made at St. John's bay, 17 miles north of Sitka, recently. Informants state the coal to be of great thickness and anthracite. It has been burned on a United States steamer, and reported on favorably. Petroleum has been found near Kat-may bay, in latitude 50° 0' 1", longitude 154° 54', abreast of Kadiak island. Three streams meet with in this locality appear covered with petroleum. Specimens of pure copper have been found on the Copper river, about 20 miles above its mouth. Masses of a cubic foot in size have been got here, and the Indians hammer out copper implements from it. Very fine marble has been found close to Sitka. Sulphur is found pure on many of the Aleutian Islands. The Aleutian Islands are all volcanic. A large, rocky island in this chain, known by the Russians as the Pojoslav volcano, rose from the sea in 1796. The spot where the St. Michael fort now stands has been covered by the sea within the memory of Indians. In fact, I have noticed in my travels along the coast, that the whole of the north coast of Cape Flattery, northward, has been suddenly elevated. Hot springs have been found at Sitka. The Indians of the coast are divided into four distinct tribes: the Koloshes, Chilkats, Aleuts and Malmeltes. The extensive sheet of water north of the Aleutian Islands is called Bering's sea, of great evenness of submarine surface at a very small depth. This sea teems with fish. It is marked by several large islands, upon one of which, St. Paul, the fur-seal fisheries are carried on. This Alaska Commercial Co. are allowed to kill 100,000 each year of young males, for which privilege they pay the United States government \$2.50 for each skin. The Shumagin Islands, on the southeast coast of Unalaska peninsula, are famed for the great cod banks in the vicinity. These banks have furnished much of the fish taken to San Francisco. The prevailing forest tree is spruce, growing to the height of 180 feet and four feet thick at the butt. Hemlock, alder and willow are found, but the most valuable wood of the country is the yellow cedar, with a fine even texture, good size and great strength. The terebo will not bore in it and after 21 years' trial at Fort Simpson, the foundation for the fort buildings was found sound, when all other kinds were completely rotten. This timber and the other kinds named cover the coast from Sitka as far north as Lituya Bay.

To Vulture City, Maricopa County, A. T.

[From our Traveling Correspondent.]

Passing from Phoenix, styled by some the "Gem City," and by others the "Garden City" of Arizona, we reluctantly leave the cool streets with the tall cottonwoods on either side, reaching over to touch boughs in the center, and also the cooling streams, trailing a boundary for each sidewalk; the air all fragrant with the scent of many flowers, that so gracefully adorn the front yards of the various dwellings; and as we near the suburbs, the orchard and vineyard, and the blue flowered alfalfa, with the waving wheat and barley fields—all these seem to say with a smile, this is "desert land." A pleasant ride of four miles along the farms brings you to the Grand canal, where you ford on graveled bottom, cooling the horses' limbs and sides. Here the freighters stop in midwater and fill up their barrels, preparatory to making a dry camp that night on the plains. These canals are the arteries of vegetable life on these plains. From this point the roads radiate in different directions across the plains, none of them are favored with a guide board to say "Prescott via Black canyon," Prescott via Wickenburg," "Tempe," Castle Creek, or any of the score of important places to be reached by these roads.

The Traveler

Must get his points and bearings well arranged before he starts, or at this place he will find at least two other roads besides the right road: and should there by chance be campers there, he may find out, that they know less about the roads than he does. But all these guide boards will eventually be erected, when not so much needed. But when on a traveled road across the plains, it is well beaten and not easy to lose that main thoroughfare.

If your animal gets tired you will find places where there is plenty of bunch grass close to the road and can take off saddle and let him eat, and take a lunch yourself. I met some Mormon freighters—they said they would camp at the grand canal that night. Noticing they had no hay, they said they had a hoc with them and would stop on the way and chop some bunch grass—enough to do them with their barley. A pleasant trip of twenty-two miles on this Wickenburg road brings us to Agua Fria or Calderwood's where the water is cold and sweet from a deep well and where they aim to treat the travelers well. Mr. Calderwood has here a stock range, and also has grain and alfalfa lands on Salt river. I met here M. Salsbury, Supt. of the

Benson Smelting Furnace.

And got a few items. The smelter had been running successfully right on as I saw it in March. They lately loaded two freight trains or 30 cars; each with 15,000 lbs. of lead bars carrying large percentage of silver and gold. They now have 10,000 tons ore on dump and 2,000 tons iron ore purchased from the edge of New Mexico. Have all the lime rock needed as flux for 100 years within one mile of the works. The company has ordered another, and larger furnace to be erected immediately which when completed will enable them to smelt 70 to 100 tons per day.

Concentrating Tailings.

He has purchased the Montezuma, a galena mine, near Seymour, from which he has been smelting ores; and also secured by purchase the vast body of Vulture mine tailings at Wickenburg, and has ordered from San Francisco a steam engine and eight large-sized Frue concentrators to reduce the quantity, and concentrate the richest portion, which will be sacked and freighted to Maricopa by teams about 60 miles, and thence by R. R. to Benson to be used as a flux, and also to add much to the value of bullion. This is a large body of tailings and is not a trifling undertaking, but after fully testing, it was considered a feasible, paying proposition, and the parties now in the undertaking mean business.

Mr. Salsbury has made his mark in the State of Nevada and Colorado as a thorough business man, and a success, and all who knew him there, prophesy success for him in all he undertakes here. But Mr. Salsbury's greatest financial success was in the Black Hills mines. His plant at Benson, A. T., gives him the R. R. privileges, being at the junction of the Mexican branch with the S. P. R. R. and well supplied with switches and room to conveniently pile up thousands of tons of ores and fluxing materials. The prospectors can bring their few tons of prospect ore and as soon as sampled and assayed they get their pay for it less \$20 per ton for cost of smelting.

Vulture Mine and City

Is 60 miles from Phoenix, and one of the noted old mines of the territory. To attempt to give any history to do justice to the great energy and perseverance of those who located, or those who followed them in guarding and working this mine would require several long chapters of very thrilling pioneer history.

The Indians were hostile and many, and knew where the few watering places were. The whites had no knowledge of the country except what they learned by very costly experience. Here in the foot hills were some high outcrops of rocks that carried veins of quartz and free gold. But sixteen miles is a long distance to go for water.

About twenty years ago Henry Wickenburg

and Mr. Peoples were prospecting, and accidentally, while seated to rest, Wickenburg discovered the vein of quartz with gold.

The undeveloped, uninhabited country, together with the hostility of the Indians and the great distance from water, made discouragements enough to have caused most persons to forever abandon all idea of working that lead. I am not able to give the names of those who shared in the various stages of the development of this, now great, Vulture mine. As early as 1864-65 they had interested parties with small means, and a road was made through the hills sixteen or eighteen miles to the nearest water privilege and there erected a quartz mill, which made the large pile of tailings lately bought by Mr. Salsbury. But to haul loads of water always back for the use of the mines and the teams, and then to travel with an armed escort of sharpshooters, all helped to increase the expenses of their operations. Mr. Yager, of Yuma was at one time hauling with ten teams, of ten large mules each, from the mine to mill at Wickenburg, to the height of sixteen hands, and of great power at \$10 per ton freight. He had a number of his men killed and lost many animals.

A Mr. Chapman of Los Angeles, was hauling one with eighty mules. He was shot and all the mules were taken. One of his drivers was shot in saddle and falling was crushed by the wagon passing over him. A butcher was shot, and many were the depredations on life and property during several years.

Mr. Hodges, now keeping a boarding-house at Vulture City, was out in this region 22 years ago. He was six years acting as a Government guide, and was at the head of a citizen's organization of rangers.

He says, "I was here with the first miners 21 years ago last June. At that time the Indians were peaceable and friendly. Mr. Peoples and his party came in from California, and discovered rich lead diggings of gold at Antelope. Some of Peoples' party lost a horse by Indians, and they shot two Indians, and then the war began; and the Indians had the best of it, for ten years." Thus many were made to suffer by the brutal rashness of whites, who were too eager to boast of killing an Indian.

There were at one time fifteen arrastras running on the Vulture ore; then a forty-stamp mill. But the very high costs of all necessities, and the losses and depredations, caused a change to be made in location of mill and much loss of time, and expense was the result. A mill was built at Seymore, eleven miles from the mines, thus lessening the distance of hauling the ore and water. This mill also is worn out and torn down years since, and now this property is in the hands of New York capitalists incorporated as the Central Arizona Mining Co. They have erected a grand eighty-stamp mill at the mine, with all the necessary steam power and labor-saving appliances, cars and tracks, self-feeders, etc., so that no hauling is necessary at the mines; an air compressor to supply the mines with good air and furnish the power for the Burleigh drills.

The Water is Pumped

Up from Seymore, or "Pump Station," on an eminence of 300 feet, and flows by gravity from there to the mill in seven-inch iron pipes. To get the supply at Seymore, it is piped in iron five miles to a reservoir, and from this, a large compound Davy engine and pump of fifty-horse power from the Risdon Iron Works, S. F., forces it to the 300 foot elevation. This machinery and the mill has been running two and a half years with excellent satisfaction and without accident.

The immense labor of this pump is shown in the fact that each twenty-four hours the mill and the city requires 250,000 gallons.

The daily consumption of wood at pump and mill is twenty-five cords, worth \$6 per cord at the mill. But next year they expect to burn petroleum instead of wood.

The eighty stamps cease not, day or night for months at a time. The daily capacity of mill is 240 tons. The ore is free milling gold rock of low grade; amalgamate in the battery, and amalgamated plates outside battery. No other devices or concentrators used for saving the gold. The mine is now employing 110 men including those employed in the mill. They now have a foundry to remelt the old castings and make new. McAllister of the Tombstone foundry was just finishing this improvement; 180 tons of old castings were on hand as materials for new castings. This will save a large item of freight expense for dies and shoes. Mr. Hughes, the Superintendent was absent on business, but a prominent person in the town remarked "everything goes on very regular and prosperous since Mr. Hughes has had charge of the works."

Mr. W. H. Davis mining foreman was very courteous in showing me around on the outside works—as was Mr. Barnes the amalgamator in showing me the inside workings.

In the office I found R. P. Todd the financial and legal adviser to be a very pleasant business man, and ready to give information.

As a prudential measure the miners pay regularly each month a small sum to R. D. Johnson, M. D.—who is known as the Co's Doctor. He too I found to be a very agreeable and scholarly young man. The laborers too seemed of the very first class, orderly and sober men. The City of Vulture is a neat little town with a school enrollment of 47 pupils. A neat little society and free reading hall, where the literary society holds weekly meetings for literary and social culture. In these meetings the mill

officials and some of the laborers in mill and mine take active interest.

This mining company can be considered as a rare illustration of how wealth is created and how a large community will really get their support, in a very expensive place, by what can be extracted from a huge outcropping rock of the desert. Good arrangement and good orderly industry accomplishes this, and furnishes even the luxuries of food and clothing to all.

Riotous strikes and interference would here be immediate ruin and desolation.

Some prospecting is still being done in the vicinity and hope of finding rich gold mines, is yet sending out prospectors on every hill and ravine. This Vulture is an immense body of gold quartz, traced and opened for a long distance as a regular vein. This generation will only partially test the resources of this mine.

B. W. CROWELL.

Hunting the Sea Otters.

The sea otters are, according to Scammon in his "Marine Mammals of the Northwest Coast," the most valuable fur-bearing animals inhabiting our ocean. They are caught as far south as 28° north latitude and northward to the Aleutian islands. The full-grown animal may be five ft. in length, including the tail. The head resembles that of a fur seal. The fur is black or dark brown. Otters have been secured along the California coast for many years, but now there are but few secured. Of late they have been shot from the shore by hunters who have wandered up and down in search of them.

The mode of capturing the sea otters between Point Greenville and the Aleutian islands varies with the different native tribes inhabiting that coast. The Aleutians, dressed in their water-proof garments, made from the intestines of the seals, wedge themselves into their *baidarkas* (which are constructed with a light, wooden frame, and covered with walrus or seal skin); and, donning their hunting caps, plunge through the surf that dashes high among the crags, and, with almost instinctive skill, reach the less turbulent groundswell that heaves in every direction. These aquatic men are so closely confined by the narrow build of their boats, and keeping motion with them, too, that their appearance suggests the idea that some undescribed marine monster had just emerged from the depths below. Once clear of the rocks, however, the hunters watch diligently for the otters. The first man that gets near one, darts his spear, then throws up his paddles by way of signal; all the other boats form around him, at some distance. The wounded animal dives

The Signing of the Declaration.

We give on this page a small reproduction of Trumbull's famous painting, "The Signing of the Declaration of Independence." The formal act of separation from the Mother country had been discussed for weeks and finally a declaration was adopted on July 4th, 1776. The final signing of the parchment copy was August 2, 1776.

American tradition has clung to the phrases assigned to the different participants in this scene: John Hancock's commentary on his own bold handwriting, "There, John Bull may read

Change in Railway Trains.

The new time card of the Central Pacific Railroad has been completed, and, unless there should be further changes made by the Union Pacific, the arrival and departure of overland trains will be as follows:

East-bound overland train will leave San Francisco at the same hour as at present. Commencing on the evening of Tuesday, July 3d, the Eastern train will arrive here at 4:25 p. m. instead of 6:55 a. m. as now, and in San Francisco at 8:40 p. m. On the 3d of July there will be two overland trains to arrive, one at

Note for Millmen.

(WRITTEN FOR THE PRESS BY C. H. AARON.)

It frequently happens in mills that bars of bullion are weighed by avoirdupois for want of proper bullion scales and troy weights. The ore assay tables for twenty grammes assays may be conveniently utilized in turning avoirdupois pounds into troy ounces, or in finding the assay value of any number of pounds.

To find the troy ounces corresponding to any number of pounds, consider the pounds as milligrammes got from an assay of twenty grammes of ore, and from the assay table take the ounces per ton which such an assay would give; multiply by ten (move the decimal point), the result is the number of troy ounces which equal the given number of pounds.

To find the value of a bar weighed in pounds, multiply the weight in pounds by the fineness, gold or silver, which gives the number of pounds of either metal in the bar; consider this number as milligrammes of metal from a twenty grammes assay, and from the table find the corresponding value in dollars and cents for the given metal. This value, multiplied by ten, is the value of the bar for that metal.

The fractions of a pound in the bar weight must be written as decimals, a half pound being 0.5, a quarter 0.25.

These methods are easier, quicker and less liable to error than the calculations. They depend upon a coincidence of figures. One milligramme bears the same relation to twenty grammes that one-tenth of a pound does to a ton, namely, 1-20,000; hence the value of a pound of gold or silver is equal to ten times the value, per ton, of ore indicated by one milligramme of either metal, in a twenty grammes assay. The assay tables are to be found in nearly all mills and assay offices, being given away by dealers in assayers' goods.

LOWER CALIFORNIA PLACERS. A dispatch from Guaymas, dated the 26th, says: By the arrival of the schooner *Rambler*, thirty hours from Muleje, the following additional news is brought from the mines direct: Prospecting is being fully pushed and several new and rich placers have been discovered. Quite a party from San Diego have arrived, having landed at the west coast at San Fernando, and thence come to the mines overland. They report good pasturage and water on their route. Small parties are straggling in also from the south end of the peninsula. A company is being formed to bring water to the regions of placers. Luis Garcia and party have struck a rich canyon about six or seven miles from the Mission. Dry washers

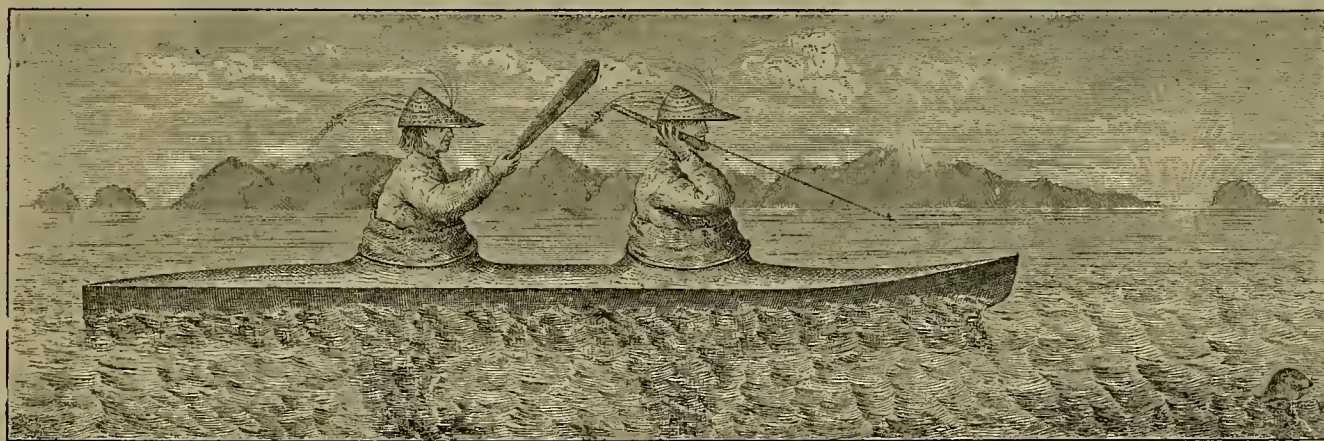


THE SIGNING OF THE DECLARATION OF INDEPENDENCE.

my name without spectacles." Franklin's, "We must hang together, or else, most assuredly, we shall all hang separately;" and the heavy Harrison's remark to the slender Elbridge Gerry, that, in that event, Gerry would be kicking in the air long after his own fate would be settled. These things may or may not have been said; but it gives a more human interest to the event, when we know that they were even attributed. What we long to know is, that the great acts of history were done by men

6:55 a. m. and one at 4:25 p. m., having left Omaha twenty-four hours apart.

Coming westward trains will leave Omaha at 12:05 p. m., arriving at Ogden at 7 a. m. of the second day. The Central Pacific train leaves at the latter hour, arriving here at 4:25 p. m. of the second day, arriving in San Francisco at 8:40 p. m. There is here a saving of 14½ hours. Leaving San Francisco at 3:30 p. m. the Eastern train arrives at Ogden at 9:30 a. m., and at Omaha at 7 a. m. of the fourth morning, instead



SEA OTTER HUNTING ON THE PACIFIC—THE ASASKA ISLANDER'S CANOE OR BAIDARKA.

deeply, but soon returns to the surface, near some one of the *baidarkas* forming the circle. Again, the hunter that is near enough hurls his spear and elevates his paddle, and again the ring is formed as before. In this way the chase is continued until the capture is made. As soon as the animal is brought on shore, the two oldest hunters examine it, and the one whose spear is found nearest its head is entitled to the prize.

The number of sea otter skins taken annually is not definitely known, but from the most authentic information we can obtain, the aggregate for the past three years has been 5,000, 1,000 of which came from the Kurile islands; and valuing each skin at \$50, amounts to the sum of \$250,000.

The principal question considered before a Cabinet meeting, one day this week, was relative to the alleged shipment of pauper immigrants to this country, from Ireland, by the British authorities. The result of the deliberation on the subject, is shown in the subsequent action of the Secretary of the Treasury, who telegraphed instructions to the Collector of Customs, at New York, to co-operate with the Commissioners of Immigration, at that port, to prevent all immigrants landing found to be paupers, within the meaning of the law. In the event of such pauper immigrants having already landed, as is reported to be the case with a large number shipped on the steamer *Farnesia*, the Collector is instructed to take all practical measures to have them re-shipped to the port from whence they came.

like ourselves, and not by dignified machines.

Even those who look with the greatest pride and hope upon the present and future of this nation, must admit that the Continental Congress contained in 1776 a remarkably large proportion of able and eminent men. Of the members who took part in that silent drama of 1776, some came to greatness in consequence, becoming presidents, vice-presidents, governors, chief justices, or judges. Others came, in equally direct consequence, to poverty, flight or imprisonment. "Hunted like a fox by the enemy;" "a prisoner 24 hours without food," "not daring to remain two successive nights beneath one shelter"—these are the records we may find in the annals of the Revolution with respect to many a man who stood by John Hancock on that summer day to sign his name. It is a pleasure to think that not one of them ever disgraced, publicly or conspicuously, the name he had written.

INTERESTING EXPERIMENTS.—In experiments made by Professor A. Wagner, with some metals and alloys and water in a certain condition, some curious results were obtained. In water containing saltpetre and air free from carbonic acid, lead and zinc were most violently attacked, tin and Britannia metal only a little, copper, brass and German silver not at all. With air and carbonic acid in the water, zinc and lead were attacked most; copper, German silver and brass were not acted upon by distilled water, while tin and Britannia were affected to some extent. None of the metals showed any signs of dissolution in the absence of carbonic acid.

of at 4 p. m., as at present, making a saving in time of fifteen hours. The Union Pacific has put on a second daily train between Omaha and Ogden, leaving Omaha at 8 p. m., and arriving at Ogden at 6.15 p. m. Returning it leaves Ogden at 9 p. m., and reaches Omaha at 3:20 p. m. The Oregon express will leave at 3 p. m. instead of 2:30 p. m., connecting at Roseville Junction with the west-bound overland, where passengers and mail from the east will be transferred. This will give a much earlier mail to the northern residents.

As to other local trains, what changes there will be has not been definitely settled, but the Colfax train will probably leave at 12:40 p. m. instead of 2:30 p. m., and 3:50 p. m. local to San Francisco will leave an hour earlier.—*Sacramento Record-Union*.

NATURE says there are 12,000 miles of underground telegraph wire in the United Kingdom. The cost of underground wire per mile is four times that of overground, while the capacity of the latter is four times that of the former.

In an interview with an *Enterprise* reporter a few days since, J. C. Flood stated a fact that is not generally known, viz., that for every fifty-five cents of silver mined from the Comstock, there were produced forty-five cents in gold.

It is believed that the Chileans will gradually evacuate the north of Peru under the treaty made with Iglesias, and that he will establish his government, commencing in Trujillo and thence leading towns.

are doing well. By the *Rambler* considerable gold was brought in, but it is almost impossible to find where it is. Three of the passengers who came over have some live pounds, and will return with provisions, etc. Quite an excitement exists here from the news, and confidence in the ultimate richness of the bonanza is freely expressed. The weather is very warm, but nights cool.

RAILROAD MEN IN UNIFORM.—On and after the 1st of July, all conductors, baggage-masters and brakemen on passenger trains in the employ of the Central Pacific Railroad company will be uniformed. The cloth of the uniforms will be navy blue. In summer, employees on the Southern Pacific may substitute blue flannel suits. Caps will be of the same color, railroad style, bell-crowned, flat top, cloth or leather visor, with a small "C. P." hutton at each side. The caps of conductors will have a band an inch and a quarter wide, with gilt braid of suitable width at the top and bottom of the band. Other men will have a gilt braid at the centre of the band. Conductors, baggage-men and passenger train brakemen will wear on the front of the cap metal or gilt-embroidered badges, designating the position of the wearer. Freight train brakemen will not have any uniform.

The last batch of immigrants from the Swinford Union, 100 in number, have gone to Queenstown, for shipment to the United States. It is said the most of them have been in the workhouse.

The Peerless Traction Engine.

We present herewith a cut and description of the lately improved "Peerless" Traction Engine, or road locomotive. The boiler is of the locomotive type, with the steam and water space so arranged that when descending steep grades the water cannot flow to the front end of the boiler, which would expose the top of the firebox, or crown-sheet. The engine is located on one side, near the top of the boiler, with the flywheel and gearing on the opposite side, making it of equal weight, and within easy access of the engineer. A frame formed of wrought iron extends from the front of the firebox to a sufficient distance to the rear of the same, where it supports the platform for the engineer, the water tanks and toolboxes on the top, and coal box under the floor. This frame is carried by heavy steel springs, which rest on stirrups attached to the bearings of the main axle. These bearings are free to slide in a vertical direction, required by the yielding of the springs upon which the entire machine is carried. Said bearings are in every other direction kept in a fixed position by guides formed in the lower end of the side plates (which are the framework supporting the counter shaft and gearing), forming pedestals similar to that of a locomotive. By this arrangement the entire weight of the machine is carried by the springs. The large or master gear wheel, shown in cut, back of the traction wheel, turns on a hollow trunnion, fastened to the side of gear frame. The main or driving axle passes through this trunnion, having sufficient room for the extreme vertical movement of the boiler and all machinery resting upon the springs, avoiding all shocks to the machinery which would be produced by passing over rough and stony roads.

On the driving axle outside of the main or propelling gear is located the compensating gear, which is of a new construction and is made with inter meshing spur pinions, which gear into internal gear-wheels, one of which is formed on the hub of one of the large driving or propelling wheels, which revolves freely on the axle, while the other is an internal gear wheel keyed to the axle which drives the propelling wheel on the opposite side, it being keyed to the axle. The inter-meshing pinions, above referred to, are carried in a wheel between the above named internal gear-wheel. The pinions are in pairs. The pairs gear together one half the width of their face on the wheel which carries them, while the other half gears into internal gear-wheels, accomplishing the same, as does the old bevel wheel compensating gear, and is superior from the fact that there is no side thrust (consuming power) as is the case with bevel gears, thus applying all the power to the gearing in the direction the wheel revolves. This gearing is all enclosed in a dust-proof case. To allow the vertical movement of the boiler and engine being carried upon the springs, and at the same time have a positive connection to the above described compensating gear and traction wheel, there is employed a universal coupling device, very simple and peculiar in construction. It consists of a malleable iron ring which is carried between the main and compensating gears, being connected elastically to the main or driving gear by two links or rods diametrically opposite each other for the forward motion, and two for the backward motion, and then similarly connected from the ring to the compensating gear. These links or rods pass through lugs or projections cast on the compensating gear, having sufficient play in the lugs to allow them to move back and forth when the two wheels change their positions. The rods or links extend far enough through the lugs to hold a series of rubber pads to take up sudden jars and shocks. The links, by being attached at right angles to each other, connecting the ring to the compensating gear, and this to the main or driving gear, permits of vertical movement of the driving gear, no matter how uneven and rough the road may be, and allows of the full power being applied to the traction wheels, without strain, acting similarly to a universal coupling, the ring having somewhat the movement of a gimbal-ring in a surveyor's instrument.

The traction wheels are of large diameter and broad face, the tire being fluted to secure better contact with the earth. The felloes are made of malleable iron, with pockets or recesses in which are inserted the spokes, and are bolted to the tire. The hub is of cast iron, surrounded by an iron ring, with its outer face tapered, and resting on this ring are the spokes, each being provided with a metal plate or heel. The spokes are retained in place by means of a plate bolted to the sides against the hub. Should any of the spokes become loose, they can be simultaneously set out against the felloes by tightening the

bolts in the hub, these drawing up on the tapered ring. By the combination of iron and wood, and the securing of quick adjustment when necessary, it is claimed that this wheel will outwear any other style for the service required.

The motion of the engine is reversed by a new device, using but one eccentric. The advantages claimed over the link motion and all other reversing devices are, that no part of it is in action, except when in the act of reversing, which makes it more durable, giving no trouble to the operator, because requiring no adjusting. It is easy to operate, there being no danger whatever in doing so, even with a full pressure of steam on the valve.

A brake is used by which the engineer can perfectly control the momentum of the engine. A steering attachment is provided, and this, together with the reverse gear, blower, throttle, cylinder cocks, fire door, ash-pan drop, and all parts requiring the attention of the engineer, is within easy reach as he stands on the platform.

This engine is protected by letters patent, granted to Mr. F. F. Landis, and is manufactured by the Geiser Manufacturing company of Waynesboro, Penn.

A Submarine Monitor.

The submarine monitor is the name of an invention by J. H. L. Tuck, an old Californian. It is designed for use in naval warfare and harbor defense. It is a cigar-shaped steel boat, thirty feet long, with six feet breadth of beam and six feet depth of hold, and is propelled by electric motors. The monitor is manned by a

captain and a crew of two men. The captain, equipped in a suit of submarine armor, is stationed on deck. He has the free use of his hands and arms, and although invisible himself, can see distinctly any objects around and above him, and can communicate with his men by telephone. Seated in the stern of the boat is the helmsman, who, by means of a horizontal fish-tailed rudder, controls the course of the monitor, and by observing an indicator, which is in front of him, can tell her exact depth under the water. The third man is stationed at the pumps. He regulates the ballast of the boat and sees that the captain is properly supplied with air. At any time that it is required, he can raise the monitor to within fifteen feet of the surface and take in a stock of fresh air, without making any surface demonstration. It is claimed for the boat that it can thus remain under water for an indefinite time, sail wherever it wills, and rise to the surface or sink to any depth, at the pleasure of its captain. In the event of war, the invisible little monitor would, after sailing about and taking observations, rise under the keel of a vessel, noiselessly attach its explosives, fire them by electricity, and then, guided by the indicator, retire to a safe distance, until the hostile ship was blown out of the water. The plan of the monitor has been highly commended by naval officers and engineers, and it is claimed, that with the services of two of these boats, an attack on our harbor, by any naval fleet in the world, could be successfully resisted.—W. H. Milliken, in the *Engineers' Chronicle*.

MORE ELECTRIC MOTORS.—The cars of the Newark and Bloomfield railroad in New Jersey, two and one-half miles in length, are being fitted with electric motors. One dynamo station, with a 20-horse power engine will be used, and the electric current transmitted along the tracks to the cars. The cars will be run for \$1.25 expense each day of 10 hours.

An Early Celebration.

During the summer of 1848, Company D of Colonel Stevenson's regiment of New York volunteers garrisoned the Mexican town of San Jose, upon the Gulf of California. The writer is under the impression that Lieutenant George A. Pendleton was at that date in command, in consequence of the arrest of Captain Naglee, by order of Colonel R. B. Mason, commanding the department of California, upon charges of shooting, without authority, prisoners of war.

As the Fourth of July approached, the members of the command felt that something must be done to celebrate the anniversary appropriately. The men, the majority of whom were under twenty-one years old, decided upon having a fandango. That was about the only amusement or entertainment possible in that remote place, and was one which they knew would meet the approval of the senoritas, of whom the town could boast a goodly number. The place chosen for the assemblage was about a mile and a half from the Cuartel, and permission was obtained for all hands and the cook (the usual guard excepted) to remain outside the sentry line all night if so inclined. Each participant paid into the general fund "quatro reales," to cover expenses. Three Mexicans were engaged as musicians, the post baker was induced to provide a good supply of cake (a luxury little known to the Mexican population), cordials were provided for the gentler sex, and mescal for the *hombres*.

At that period of the year the days were extremely warm, consequently the "exercises" were delayed until an early hour of the evening. With the setting of the sun, our boys, in small squads, strolled across the Arroyo towards the

The Broken Dam.

The Milton Mining and Water Co. are so well satisfied that the breaking of their large dam was due to human agency that they offer a reward of \$5,000 for the arrest and conviction of the person or persons guilty of the act. It has always been understood that the burning of the brush dam built by the State on the lower Yuba was done by persons inimical to mining, and it is suspected that this dam was also destroyed purposely. At all events, the company is so well convinced of it that they offer a big reward. The dam that was broken last week is situated about twelve miles above Eureka. It lies partly in Nevada and partly in Sierra counties. The dam was built twenty-four years ago, at a cost of \$75,000, and was what is known as a crib dam, being constructed of heavy timbered cribs, filled with earth and rock. Eight years ago it was greatly strengthened at large expense.

It was also raised thus increasing the capacity of the reservoir. This was done by putting a very deep facing of stone on the outside, and also a stone lining on the inside, carrying the comb a considerable height above the top of the old dam. The inside facing of the dam which has an incline of about forty-five degrees, is lined with plank. The sectional width at the base was about 350 feet. The perpendicular height of the top of the dam above the base of the outside escarpment was about 131 feet, but, as the channel, across which it is thrown, has a very rapid descent, the depth from the surface of the water to the toe of the inner face was about 86 feet. The dam itself was about 400 feet long, and the dam it formed back of it was about two and a half miles long, and a half-mile wide. At the point where the dam is located there are three ravines or gulches, which necessitated the embankment of the dam being built in three sections. As the flood swept down the river canyon it carried everything in its path, uprooting giant trees, removing ponderous boulders and playing sad havoc with cabins, bridges and other structures it met with. Back of Graniteville the water is said to have been at least 100 feet high. At Moore's Flat it reached a height of 60 feet. The English dam was owned by the Milton. Their loss will be enormous, as the dam contained a full season's supply of water, without which the company's mines and ditches are useless.

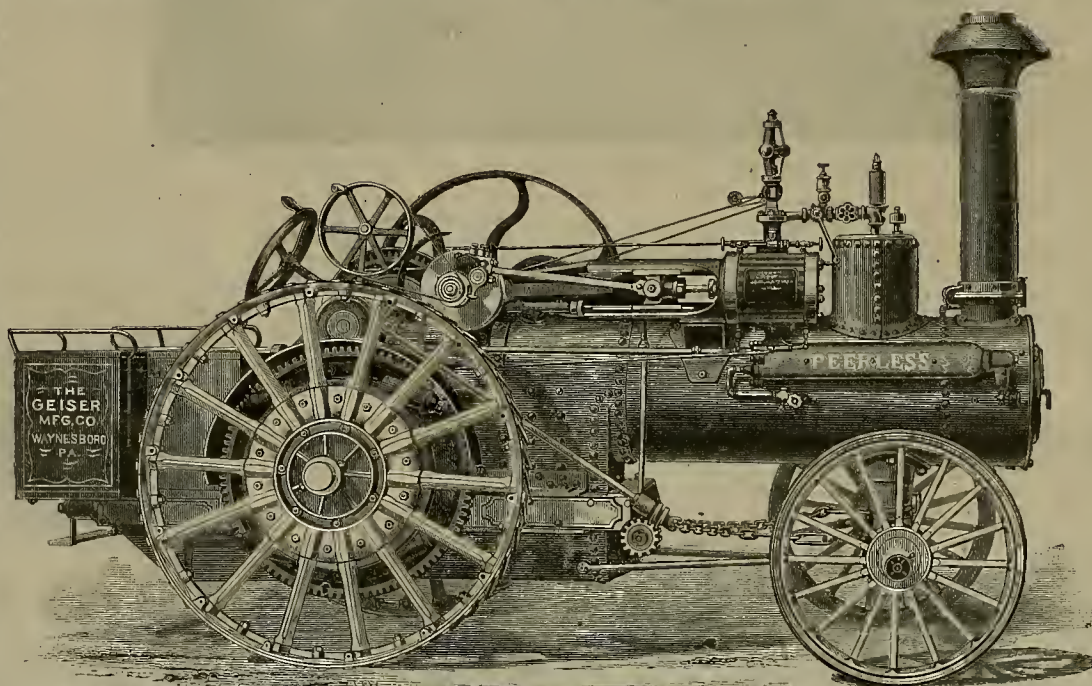
Henry L'choir, acting president of the Milton Company, said speaking of the loss to the company, resulting from the break of the dam, it cannot be computed with anything like accuracy until it is known what property, destroyed by the rush of waters in their course, will have to be paid for. The mere cost of building the dam does not by any means represent the amount of loss. One item alone—the profits the company would have derived from the use of the water that was lost by the breach—is estimated at \$75,000. This figure is set down as the value of the water alone, computed on the basis of the work it would have done. If the company should conclude not to rebuild this year, it loses all of next winter's water supply, thus enforcing idleness on its mines, which are dependent solely upon this source. It is should determine to rebuild this year, in addition to the water lost, valued at \$75,000, the company will have to be at expense of about \$150,000 for construction. The flume which carries the water from this dam to the mine is 75 miles long. With the exception however, of a few boxes near the dam, it is reported unimpaired.

In view of the uncertainty of the outcome of the pending litigation, in which the debris question is involved, the company has not yet determined whether it will be rebuilt immediately, as it does not desire to put \$150,000 in work which they may not be permitted to use after it is completed. The altitude of the reservoir is about 5,000 feet above the sea level, and is located at the source of the Middle Yuba.

The Red Star Line Steamship Company, plying between New York and Antwerp and Philadelphia and Antwerp, is building two new vessels, the *Hesterland* and *Moorland*, each of 5,500 tons register, to accommodate the increasing passenger travel.

GREAT distress is reported among the fishing families along the Labrador coast owing to the detention of spring supplies by a jam of gulf ice along their shores. It is feared that some deaths from starvation have already occurred.

Of forty-two deaths at Damietta (Egypt) Monday, twenty-eight are known to be from cholera. The rest, it is supposed, were from the same malady.



THE PEERLESS TRACTION ENGINE OR ROAD LOCOMOTIVE.

rendezvous, situated about midway between the town and the Gulf. In due time the senoritas also put in their appearance. Many of the male Mexicans hovered around in the gloom, while those more friendly disposed joined in the festivities. The volunteers were indifferent to the feelings of the unfriendly Mexicans, being themselves in sufficient number to repel any assault. They had brought their bayonets with them, suspended to their sides, while some had also pistols. This precaution was a necessity, and no doubt cooled the ardor of the enemy; at least, no occasion arose for their use. The boys enjoyed the evening dance to their full satisfaction, and often afterwards, while they sat at their camp-fires in the gold-diggings, the evening entertainment in the lower country was related.

Over thirty-four years have passed since that frolic, and the majority of those present have long since gone to their last rest. William S. Johnson, James A. Gray, Joseph Sims, Carl Lipp, James Harron; Charles Rosseau, John B. Phillips, Alpheus Young, and George W. Tombs are still residents of this State; while John Wolfe, Alden W. James, George A. Corgan, John A. Chandler, Francis D. Clark, and Jacob W. Norris are residents of the Atlantic States. Of the dead, we recall to memory the genial spirits, Aaron Lyons, Harry Wilson, Hawk Judson, Jack Warrington, John W. Moore, and Charley Ogde. Six nobler comrades it was never the lot of man to associate with; and to this day their memory is ever green to their living comrades of the early Californian days.—July Overland.

LONG RUN.—During the run of the Independence-Navajo mill just closed, at Tuscaraora, commencing on the 20th of July, 1882, and ending on the 10th inst., it has turned out bullion to the amount of \$818,866.42. This, for a mill of but ten stamps, is probably the best record in the State of Nevada.

The Sitka District.

The Southern Division of Alaska.

The people of the United States are taking now very much more interest in Alaska than formerly. Its mines, forests and fisheries are evidently destined to create wealth for the pioneers of the region, though as yet there are comparatively few people in the country. The editor of this journal had an opportunity not long since to talk with Mr. Krause, who spent a winter in the southern division of Alaska, the so-called Sitka district. He had an opportunity of visiting nearly all the principal settlements of the Indians, and the few towns of the white men, in the endeavor to obtain information about the country and its inhabitants.

Mr. Krause says that southern Alaska reminds him in more than one respect of the west coast of Norway. In both countries is met a mountainous coast thickly covered with wood; numerous islands, and between them a complicated system of navigable channels of different sizes; a climate moderated in a high degree by the influence of large oceanic currents; numerous resources and good fishing grounds, and an Arctic scenery of peculiar and beautiful attraction, which is frequented, at least in Norway, every summer season by thousands of travelers. But Mr. Krause agrees with Dr. W. H. Dall, that Alaska is in every respect superior to Norway, and no one who has visited these regions will doubt the wisdom of Seward's policy, although the part of country referred to has not proved, so far, the most valuable one of the whole purchase.

The population of southern Alaska is very small. The number of the Indians will scarcely exceed 10,000, and there are not more than 300 to 500 permanent white settlers. No doubt the country would have a far greater population, but the Pacific coast states and territories being far more attractive, it is not expected that any considerable increase of population will take place, unless newly discovered gold mines prove of high value.

Indian Tribes.

There is also little hope that the Indian tribes will be preserved from the common fate of the red man, notwithstanding the efforts made for their civilizing and christianizing. These Indians belong to the Thlinket people, with the exception of four tribes of Hydas, in the southern part of Prince of Wales Island. It is a remarkable fact that the Thomnets, Hydas and Chymians, although they differ wholly in language and features, have adopted the same customs and the same superstitious beliefs, originated, it seems, by the Hydas.

The most powerful and, unless to a recent date, most warlike of the Thlinket tribes are the Chilcats, at the head of the Lynn channel, geographically divided by a long, narrow peninsula, into the Chilcats proper, settled in two villages at the Chilcat river—one near its mouth and the other some fifteen miles inland—and the Chilcats, at the Chilcat lake. These Indians do not hunt or fish as much as the Thlinket tribes. For many years they have monopolized the trade into the interior, and they are very anxious to keep the white traders and the other Indians from a direct trade with the nomadic Indians at the headwaters of the Yukon river.

Expeditions for trade are organized by Chilcat Indians during the whole year—even in winter. There are two principal routes in the interior, the shortest, but most difficult one is on the eastern side where from the head of a deep channel a branch leads off to the lakes, which empty their waters into the Yukon. They travel no more than three days. From the Chilcat river to another chain of lakes they travel six to seven days. Both routes meet afterwards near the abandoned fort of the Hudson Bay Co. which was once destroyed by a Chilcat expedition. But the Chilcats are not allowed to take the western route.

In winter time they go on

"Snow Shoes"

Manufactured by the Indians in the interior and also by themselves. On both sides they have to cross a glacier. In the interior they do not find so much snow as on the coast. They seldom use sledges and nowhere dogs for sleighing. They carry their provisions and merchandise themselves, or the richer ones by servants, taking as trading goods mostly tobacco leaves and some blankets. In former years the Chilcat Indians went also over the mountains to Yakutat bay where they get sea otter skins but now

the Sitka Indians claim the trail and the Chilcats gave it up.

The Headwaters of the Yukon.

The second river in size in North America, being so near the sea coast, can be reached in three days. This interesting fact will in future time be of economic value. Two years ago, some miners took this route and went down the river nearly as far as Fort Yukon. Others have gone that route since, but it is mountainous and a hard trip.

Local Manufacturing Notes.

MESSRS. SAVAGE & SONS' Iron Foundry is doing a large business at their place on Fremont St., S. F., employing the best class and skillful workmen.

The Tonite Powder Co., 218 California St., S. F., report a good trade with increasing orders. They make a high grade powder, quite popular among consumers, and enjoy a good trade accordingly.

ONE of the best known manufacturers in the line of oak tanned leather belting is L. P. Dege, whose factory at 128 and 130 First street, S. F., is prepared to furnish, at short notice, the best rawhide lining, cut strings and sides. Liberal discounts are given on large orders. The products from these works enjoy good repute.

THE Mechanics' Foundry, located at Nos. 213 to 219 First street, S. F., are running full with orders and are doing first class work. They manufacture to order quartz mills and all kinds of machinery castings, stove plate, light, fine and smooth castings, car wheels, gas and water pipe, etc. The officers are John C. Quinn, President, and G. W. Kelley, Business Manager.

The Columbian Foundry at 133 and 135 Beale St., are quite busy in the manufacture of house fronts and machinery castings of all kinds. Mr. Reese Llewellyn the proprietor of these works is also patentee of the Llewellyn's Heater Filterer and Condenser for steam boilers, a mechanical contrivance simple and useful. It is claimed for the Patent Filterer, Heater and Condenser that it saves fuel, water, labor, wear and tear of tubes and plates, repairs and also risk of explosion. The saving in water alone is said to be 33%. Among the many testimonials already given to the inventor, who strongly recommends its efficacy are the C. P. & S. P. R. R. Co's, Union Pacific R. R., Mare Island Navy Yard, the N. O. Mint and many others.

MR. L. MILLER, JR., of 335 Bush street, S. F., has made quite a reputation lately, having secured the contract and been awarded first prize for the manufacture of the elegant and rich trophy, made of solid gold and silver only, to be contested for in a competitive drill of the Knights Templar, during the coming Conclave this summer. It is a veritable work of art and can be seen at his studio, 335 Bush street, where he is also engaged in manufacturing jewelry and diamond setting, working in quartz, moss-agate, mineral and cabinet jewelry. Quartz specimens bought and sold.

Banking.

The Bank of California still maintains its position in the front rank of banking, with a capital of \$3,000,000. This bank is one of the best advertised concerns in its line throughout the United States. A large foreign business is transacted, and they have a branch at Virginia City, with correspondents in all prominent mining centers, which is a feature of this institution. The officers are: Wm. Alvord, President; Thos. Brown, Cashier; B. Murray, Jr., Assistant Cashier.

A conservative firm of good repute are Messrs. Sather & Co., bankers, located on Montgomery street, corner Commercial, San Francisco. Mr. J. S. Hutchinson is cashier of this bank. They make a specialty of bills of exchange and telegraphic transfers on Drexel & Co., of New York and Philadelphia, and make collections in all parts of the United States, issue letters of credit, and draw bills of exchange on London, Paris, Hamburg, Cologne, Berlin, Bremen, and chief cities of Europe.

Among the leading banking institutions in San Francisco is the First National Gold Bank. The institution has a paid-up capital of \$1,500,000, with a surplus fund and undivided profits of over \$300,000. A general banking and exchange business is transacted, and drafts and commercial credits are sold on principal cities of the United States and chief cities throughout the world. The officers are: D. Callaghan, President; G. A. Low, Vice-President; E. D. Morgan Cashier—the directors being composed of prominent and substantial citizens.

SULPHURIC ACID FUMES IN CONSUMPTION.—It having been observed that, in connection with a manufacturing process, involving the production of slight fumes of sulphuric acid, and which has been carried on for 44 years in the vicinity of London, not a single instance of consumption had occurred among the great number of workmen employed, the natural inference was that the immunity was due to the acid fumes. The director of the manufactory—a pupil of Liebig—has hence suggested that a new method of treatment for consumption should be adopted, by bringing the patients into contact with an atmosphere moderately charged with sulphuric acid.

Make yourself healthy and strong. Make life happy by using Brown's Iron Bitters.

About Obtaining Patents.

Patents are Virtually Contracts

between inventors and the public. The consideration flowing from being parties to the contract is expressly made by statute. The government requires the following consideration in every case: First, that an applicant for a patent shall disclose a new and useful improvement, of which he is the first and original inventor. Second, that the invention has not been patented, or published in any printed publication prior to the date of his invention. Third, that the invention has not been in public use, or on sale, more than two years prior to his application for a patent. Fourth, that the invention shall be properly described and claimed in the specification forming a part of the patent. Provided an inventor complies strictly with these conditions, the Government guarantees that the inventor shall have the exclusive right to make, use and sell the thing invented for the term of 15 years.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which his invention relates. This question can often be answered gratuitously by an inventor, or by a respectable firm of attorneys of the invention, by reason of our long and extensive practice as patent solicitors and editors and publishers of first-class, scientific and industrial journals, during the past 20 years, we have been in the habit of priority of invention is not so readily to be determined as it is generally thought to be. It is termed a "preliminary examination," by searching through the patent office reports among the patents in the class to which the invention relates, and referring to our extensive patent library, containing copies of all the special classes of American and foreign inventions, mechanical dictionaries, scientific encyclopedias, files of scientific and mechanical newspapers, and an immense number of patent applications by inventors of the Pacific coast, carefully filed by this office since 1829.

If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report, advising definitely whether his invention has been anticipated, thereby saving him further expense and perhaps much time, useless delay, anxiety, etc.

To avoid all unnecessary delay, however, in securing patents at the earliest moment practicable, inventors will do well to send us an application for a patent well prepared, containing a full and comprehensive description of their invention, and distinctly what the particular points of improvement are, with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately, and forwarded to the inventor for his signature. When the inventor receives the application and finds it duly prepared, he will carefully sign and return the same promptly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. (This course is the most expeditious and satisfactory, as no time is lost in transcribing copies of the drawings for the Patent Office, and the steps to be taken.) When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly for our own fee. The case will then be a chance to obtain a patent. The Agency charge is from \$25 to \$30, or sometimes more, if the invention is intricate or complicated, or requires much labor. Drawings cost from \$5 upward, according to their number and the complexity of the invention. A model is sent, the express charges upon this and the papers must be added. The total cost, in addition to Government fees, rarely exceeds \$40, and for this we do all we can without appealing the case.

When a model is required, a full article of manufacture, or a new composition, samples of the separate ingredients sufficient to make the experiment and also of the manufactured article itself, must be furnished.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are considered more satisfactory than the old and cumbersome system of storing up an immense bulk of all sorts of miscellaneous models.

Drawings or sketches sufficient to illustrate clearly the invention, with a sufficient description to enable us to make a full set of perfect drawings for the Patent Office is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it for our use.

The value given for the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or very poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the deficiencies and weaknesses of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had the invention been fully portrayed by artistic and skillfully executed drawings. Again, when patents are brought into court, the uncertainty and ambiguity of the drawings enable the opposing experts to mystify the judges as to the construction or combination of parts intended to be covered by the patentee. In all cases, therefore, the inventor should make use of our personal supervision by skilled draftsmen in our constant employ, and every precaution is taken that the invention is fully and clearly shown by different views, so that the improvement will be readily understood by the examiners in the Patent Office and comprehended by the public when the patent is granted.

In the Patent Office

The application is assigned to the Examiner having charge of the class to which the invention relates. The case must then take its turn with others in the order of filing, and in due time is carefully examined to test the novelty of the invention. If the examiner fails to find anything that anticipates the invention, a patent is immediately issued, provided the specification and claims are drafted in proper form. Should the Examiner find a prior patent which, in his opinion, anticipates one or more of the claims in the application, a letter of rejection is sent to the attorney in charge of the case, and if the attorney coincides with the views of the Examiner, the claims rejected are erased. In preparing applications for patents, an attorney should be careful to familiarize himself with the class of inventions to which the application pertains, so that the specification and claims may be drafted as nearly perfect in the first instance as is possible. This course saves much time in prosecuting the application to a patent.

When claims are improperly rejected on patents which do not anticipate, a patent is immediately issued, and our steps are immediately taken to convince the Examiner of his error. This is done, in most part, by personal arguments, as the differences in construction, operation, function and results are more readily discovered and appreciated by an oral presentation of the facts than can possibly be done by relying solely on written arguments. In order that the Patent Office record of the patents shall be complete, an oral argument is generally supplemented by a manuscript brief, that contains a summary of the points of novelty, and may clearly comprehend the position taken by the Examiner and attorney in prosecuting the case to a patent.

In addition to our own personal attention to the interests of our clients, we have, since 1829, maintained our own law office in association with us in Washington, one of the foremost legal counselors and ablest of practitioners in patent business in this country, who carefully attends in person to our business at the Patent Office, and has attained success in a most remarkable degree.

Perfect Claims

The value and force of a patent are dependent on its claims. A patent is of no value to the public in the most important and valuable invention, and yet the claim be of such meager scope that the patent is actually worthless. When the claims of a patent are so loosely drafted that infringers can defeat the market with their improvements, deriving from the improvement disclosed by the patent only in slight changes in construction and arrangements of parts, such a patent is valueless to the owner, as it fails to afford him that exclusive and complete protection guaranteed by the

Patent Law. Hence it is that the greatest care, skill and perseverance are required, first, in properly drafting the claims in the first instance, and second, in prosecuting the application before the Patent Office, and maintaining the rights of the inventor to claims as broad and sweeping as the invention will warrant. This latter is no easy task. The Examiners of the Patent Office serve in the capacity of attorneys guarding the interests of the public. It is their duty to exercise the greatest care and watchfulness, that patentees do not secure claims of greater scope than they are justly entitled to. It is but natural that Examiners are sometimes in error as to just what scope should be accorded an invention. Although the Examiners act under a sworn duty to not secure claims of greater scope than the inventor is justly and fairly entitled to the claims of his invention, if he is convinced that they are just and proper. To succeed in this requires the display of tact, firmness and ability; and when the Examiner is made to see that the inventor is honestly and fairly entitled to the claims which have been rejected, he will almost invariably recede from his former action, and allow the case.

Advantages to Inventors on the Pacific Coast.

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COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$4 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times,) by turning a leaf.

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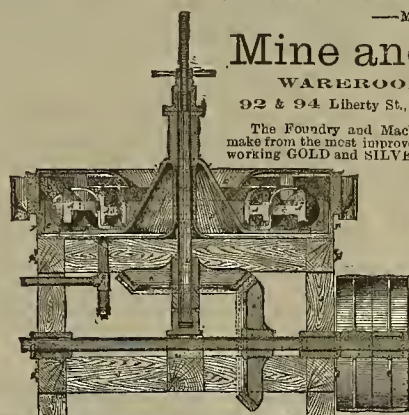
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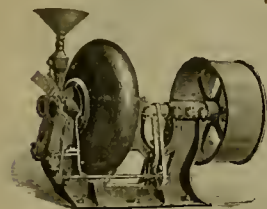
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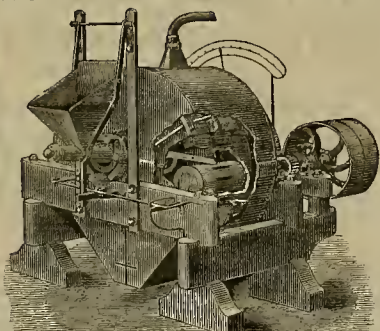
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PATENTS AND INVENTIONS

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING JUNE 19, 1883.

279,694.—TRANSMITTING POWER FROM A CENTRAL STATION.—John L. Boone, S. F.
279,640.—DRY ORE SEPARATOR.—M. B. Dodge, S. F.
279,641.—SEPARATOR FOR WET ORES.—M. B. Dodge, S. F.
279,643.—MINING KNIFE.—Catharina Gilberts, S. F.
279,745.—TAP AND FAUCET.—Gregg and Briody, Santa Cruz.
279,750.—RASP.—S. T. Harrison, S. F.
279,758.—ADJUSTABLE HORSESHOE.—Peter Hicks, Napa, Cal.
279,769.—SAW-SWAGE.—Simon Kinney, Port Townsend, W. T.
279,770.—ADJUSTABLE GRATE.—Frank Knox, Woodland, Cal.
279,878.—PHOTOGRAPHING MOVING OBJECTS.—E. J. Maybridge, S. F.
279,603.—FAN WHEEL.—W. Schmolz, S. F.
279,831.—LINK PROTECTOR.—A. V. Smith, S. F.
279,834.—DRILLING MACHINE.—Jas. C. Smith, The Dalles, Or.
279,613.—WHEEL HARROW.—Thos. A. Sweet, Cambria, Cal.
279,675.—CAR COUPLING.—S. G. A. Urquhart, S. F.
279,719.—FRUIT DRIER.—A. Crawford, Sebastopol, Cal.
13,992.—DESIGN BADGE, OR EMBLEM.—Philip H. Kinn, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through DEWEY & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

AUTOMATIC ADJUSTABLE GRATE.—Frank A. Kuore, Woodland, Yolo Co., Cal. No. 279,770. Dated June 19, 1883. This invention relates to a new and useful adjustable grate, the operation of which is automatic, and it consists in the details of construction of a grate supported by the free ends of levers pivoted at opposite ends in the fire-box, and in a means of operating a weight upon the outside of the box for raising the free ends of the supporting levers and elevating the grate as the coal is consumed. The object of this invention is to keep the fire near the top of the fire-box, no matter what the state of the coal may be. Adjustable grates depending upon the direct operation of some person, and which, when adjusted and set, remain so until again altered are common, but the object of the inventor is to furnish a grate which shall adjust itself by rising as the coal is consumed, so as to keep the fire near the top.

TAP AND FAUCET.—Isaac N. Gregg and Edward Briody, Santa Cruz, Cal. No. 278,745. Dated June 18th, 1883. This tap and faucet consists in a pipe or tap screwed permanently into the vessel, and provided with vents or ports at its rear end. Within this end is screwed a solid plug, the threads of which, when under the ports, close them, but when moved, lock open them, so that the fluid may find an escape by the smooth portion of the plug, which is of sufficiently smaller diameter to form such a passage. This plug is operated by a faucet, the end of which is provided with a mortise; the faucet screws into the tap and engages with a tenon upon the end of a plug, said tenon only reaching into the mortise far enough to leave a passage through the latter into the faucet. The object is to furnish an effective tap and faucet, and one in which the parts are not liable to bind or otherwise get out of order.

ADJUSTABLE HORSESHOE.—Peter Hicks, Napa, No. 278,758. Dated June 18, 1883. This invention relates to certain improvements in horseshoes, by which the inventor is enabled to so adjust them to the hoof as to allow the latter perfect freedom to expand both at the front and rear. It consists of two curved bars fitting the sides of the hoof and meeting at the front. These bars are made straight or flat across the front edge, and may have a dovetailed groove or projection across their front edges to receive a transverse bar, which is correspondingly tongued or slotted to fit the front of the side plates as one, while it allows them so separate sidewise to accommodate the expansion of the foot.

CAR COUPLINGS.—Samuel G. A. Urquhart, S. F. No. 279,675. Dated June 19th, 1883. This invention relates to certain improvements in car couplings; and it consists of a novel construction of a bumper loosely supported from its rear end, of a spring-actuated coupling-pin, of peculiar form, and lever connections by which the pin link may be raised for the admission of an approaching link, so as to couple therewith; and of certain details of construction. By this

coupling there is no necessity for going between the cars, as the link can be raised either from the top or side of the car.

LINK PROTECTOR.—Andrew V. Smith, S. F., Cal. No. 279,831. Dated June 19th, 1883. This invention relates to a new and useful means for protecting links from wear by friction, whether the said links are used in a chain or singly. It consists in a peculiar independent, removable bearing, adapted to fit and to be wedged or keyed into the end of the link. The object of the invention is to prevent wear of the link.

FRUIT DRIER.—Adam Crawford, Sebastopol, Cal. No. 279,719. Dated June 19, 1883. This fruit drier consists in an iron frame or building constructed in a peculiar manner. The object of the invention is to provide a strong and durable apparatus adapted to withstand the heat, being fire-proof, and especially adapted for the circulation of the heat.

DESIGN FOR A BADGE.—Philip H. Rinn. Dated January 19, 1883. This invention relates to a novel design for pin, badges or emblems which are made in the form of a maltese cross; and it consists of a mosaic or inlaid work of squares upon the arms of the cross so as to imitate a tessellated pavement in perspective.

Enlarged Issues of the Mining and Scientific Press.

It is the intention of the publishers of this journal to spare no enterprise in advancing the future interests of its readers by all reasonable and practicable methods. Among other advances, we contemplate issuing soon several extra sized sheets, especially devoted to different important localities. The next will be on

Utah Territory, July 2nd.

We shall issue a special double edition about Utah has won for herself a bright name from her many dividend paying properties, and each year her mineral resources are being more and more developed. The mines are scattered over a wide region and are in great number. The record of bullion shipments is highly encouraging in the interests of legitimate mining. A general description of the mining regions with such maps as will aid in illustrating the location of the districts, will be given in this edition.

Other double editions will follow shortly after, which will be devoted to the special interests of other mining localities.

All these regions possess more or less interest for California and San Francisco. We ship goods of certain kinds from here, and, from a commercial point of view alone, our interests are mutual. Moreover, the advancement of these regions does good to the whole coast, in which we are all interested.

Persons who can contribute information of special or general interest to our readers for these various issues are solicited to send the same as early as possible. If miners will send us descriptions of their mines or camps we shall be very glad to receive them.

As we make this extra effort to advance the interests of all concerned in the places named, we ask that all who can, to favor our enterprise by making the matters more widely known, and the MINING AND SCIENTIFIC PRESS more extensively patronized. The mining literature of the world is comparatively limited. Miners and scientific men especially should be liberal to assist their helpers in a line of publication, which, at best, cannot be expected to be largely profitable while doing strict justice to the highest interests it represents.

The dates of issue of the proposed extra sheets may be varied, if circumstances should demand it, but due notice will be given.

DEMAND it, and take no other iron preparation except BROWN'S IRON BITTERS. It is the best.

California Inventors

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This paper is printed with Ink Manufactured by Charles Ene Johnson & Co., 509 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph B. Dorety, 439 Commercial St., S. F.

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Its wonderful curative power is simply because it purifies and enriches the blood, thus beginning at the foundation, and by building up the system, drives out all disease.

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My health was much shattered by Rheumatism when I commenced taking Brown's Iron Bitters, and I scarcely had strength enough to attend to my daily household duties. I am now using the third bottle and I am regaining strength daily, and I cheerfully recommend it to all.
I cannot say too much in praise of it. Mrs. MARY E. BRASHBAK, 173 Prentiss St.

Kidney Disease Cured.

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Suffering from kidney disease, from which I could get no relief, I tried Brown's Iron Bitters, which cured me completely. A child of mine, recovering from scarlet fever, had no appetite and did not seem to be able to eat at all. I gave him Iron Bitters with the happiest results.
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Heart Disease.

Vine St., Harrisburg, Pa. Dec. 2, 1881.
After trying different physicians and many remedies for palpitation of the heart without receiving any benefit, I was advised to try Brown's Iron Bitters. I have used two bottles and never found anything that gave me so much relief.
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Plans are on exhibition and stock ready for issue. Any information that is desired can be furnished at this office as above.

DIVIDEND NOTICE.

San Francisco Savings Union

532 California Street, Corner Webb.

For the half year ending with June 30, 1883, a dividend has been declared at the rate of four and thirty-two hundredths (4 32-100) per cent per annum on Term Deposits, and three and sixty-one hundredths (3 60-100) per cent per annum on Ordinary Deposits, free of taxes, payable on and after THURSDAY, 12th July, 1883.
LOVELL WHITE, Cashier.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending June 30, 1883, the Board of Directors of the GERMAN SAVINGS AND LOAN SOCIETY has declared a dividend on Term Deposits at the rate of four and thirty-two hundredths (4 32-100) per cent per annum, and on Ordinary Deposits at the rate of three and six-tenths (3 6-10) per cent per annum, free from Federal Taxes, and payable on and after the 21 day of July, 1883. By order, GEO. LETTE, Secretary.

THE PACIFIC RURAL PRESS, a most excellent publication, with the beginning of the new year donned a new and exceedingly neat typographical dress. Its reading columns needed no improvement. —*Alameda Enquirer.*

Mining Companies.

Persons interested in incorporations will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for advertising.

ASSESSMENT NOTICE.

Gould and Curry Silver Mining Company.

ASSESSMENT No. 45.
Leviell June 15, 1883
Delinquent July 20, 1883
Day of Sale August 13, 1883
Amount Fifty cents per share.
ALFRED R. DIBBEROW, Secretary.
OFFICE—Room No. 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Bulwer Consolidated Mining Company

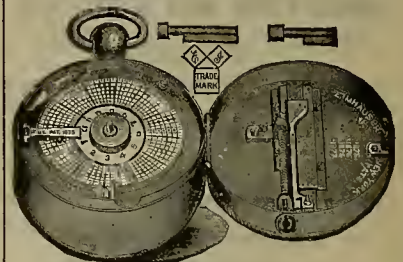
San Francisco, June 21, 1883.

At a meeting of the Board of Directors of the above named company, held this day, Dividend No. 18, of fifteen cents (15c) per share, was declared, payable on Monday, July 2, 1883. Transfer books closed on Saturday, June 23, 1883, at 12 o'clock m. This dividend is payable at the Farmers' Loan and Trust Company in New York, on all stock issued there, and at the office in this city on all stock issued here. WM. WILLIS, Secretary.

OFFICE—Room 20, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

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Watchman's Improved Time Detector, WITH SAFETY LOCK ATTACHMENT.



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JOHN L. BOONE,

Attorney and Counsellor-at-Law,

Rooms 7, 8 and 9,
No. 320 California Street, S. F.,
(Over Wells Fargo & Co.'s Bank.)

Special Attention Paid to Patent Law.

N. B.—Mr. J. L. Boone has been connected with the Patent business for over 15 years, and devotes himself almost exclusively to Patent litigation and kindred branches.

C. H. AARON,

CONSULTING AND PRACTICAL METALLURGIST.

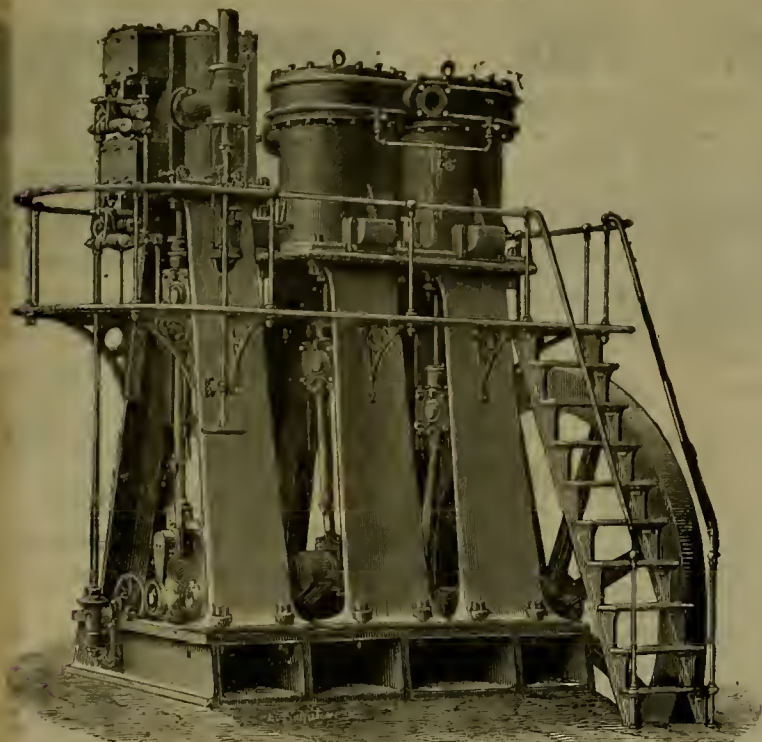
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SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

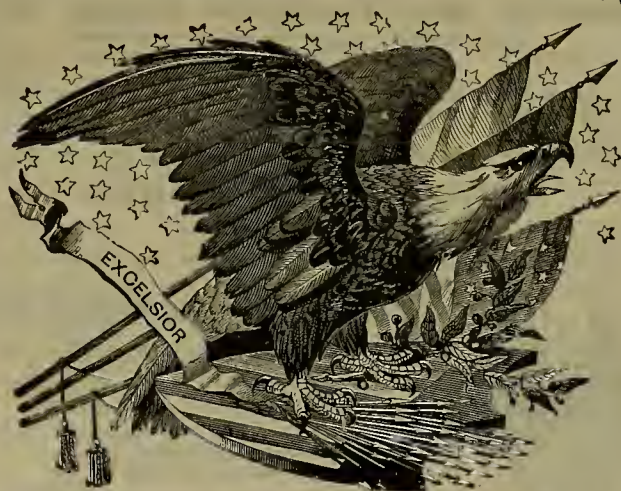
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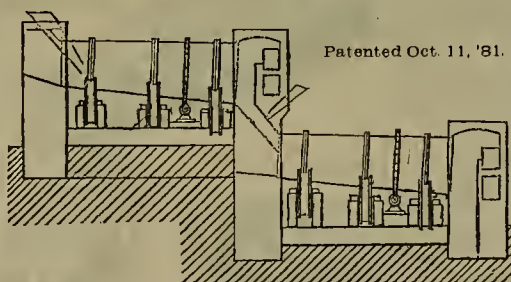
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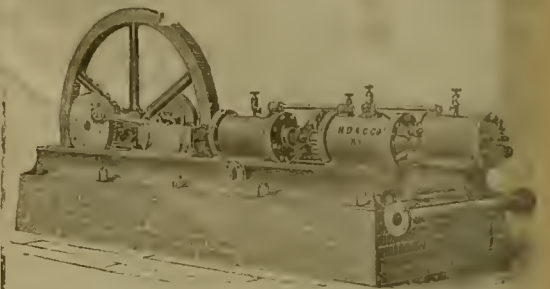
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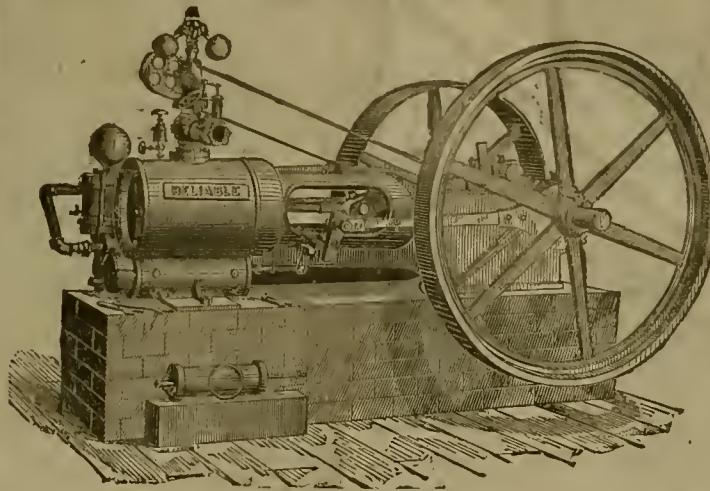
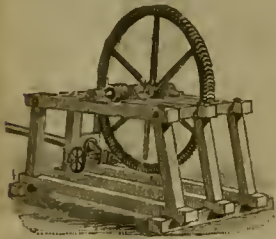
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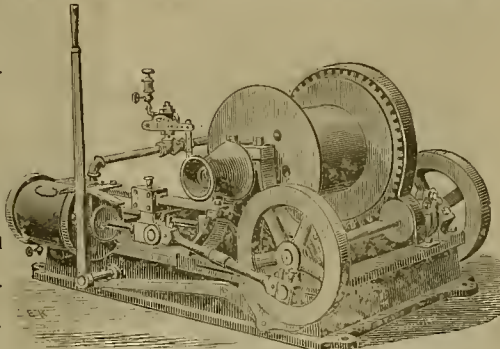
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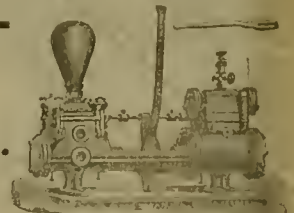
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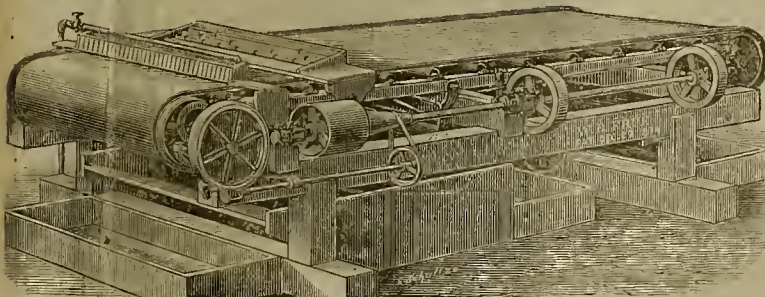
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That suit has been commenced in New York against an end-shake machine similar to the Triumph, and that as soon as decision is reached in the courts there, proceedings will be taken against all Western infringements.

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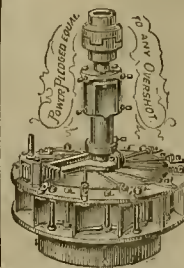
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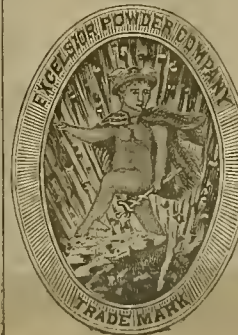
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From January to June, 1883

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